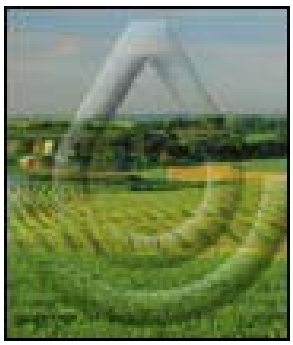
United States Department of Agriculture

Environmental Quality Incentives Program

Draft Benefit Cost Analysis



February 12, 2003

FORWARD

Pursuant to Executive Order 12866, Regulatory Planning and Review, the Natural Resources Conservation Service has conducted a benefit cost analysis of the Environmental Quality Incentives Program (EQIP) as formulated for the proposed rule. The analysis estimates EQIP will have a beneficial impact on the adoption of conservation practices and, when installed or applied to technical standards, will increase net farm income. In addition, benefits would accrue to society for long-term productivity maintenance of the resource base, non-point source pollution damage reductions, and wildlife habitat enhancement.

Congress passed amendments to the program that requires the Secretary of Agriculture, within 90 days after the enactment of the EQIP amendments, to promulgate regulations necessary to carry out the program.

The Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994, Title III, Section 304, requires that for each proposed major regulation (any regulation that the Secretary of Agriculture estimates is likely to have an annual impact on the economy of the United States of $100 million in 1994 dollars) the primary purpose of which is to regulate issues of human health, human safety, or the environment, USDA published an analysis of the risks addressed by the regulation and the costs and benefits of the regulation.

Rules and Documentation covering the creation of USDA Cost/Benefit Analysis:

- Executive Order 12866, Regulatory Planning and Review[1]
- Unfunded Mandates Reform Act of 1995[2]
- Federal Crop Insurance Reform Act of 1994[3]

In considering alternatives for implementing EQIP, USDA followed the legislative intent to optimize environmental benefits, address natural resource problems and concerns, establish an open participatory process, and provide flexible assistance to producers who apply appropriate conservation measures that enable Federal and State environmental requirements to be satisfied.

Because it is a voluntary program, EQIP will not impose any obligation or burden upon agricultural producers who choose not to participate. The program was authorized by the Congress at $5.8 billion over the six-year period beginning in fiscal years 2002 through 2007, with annual amounts of $400 million for 2002, $700 million in 2003, $1 billion in 2004, $1.2 billion in 2005 through 2006, and $1.3 billion in 2007.

[1] Executive Order 12866 of September 30, 1993--Regulatory Planning and Review, http://www.epa.gov/fedrgstr/eo/eo12866.htm
[2] Unfunded Mandates Reform Act of 1995, PL104-4, http://www.regulation.org/pl104-4.html
[3] Federal Crop Insurance Reform Act of 1994, PL103-354, http://www.reeusda.gov/1700/legis/agreorg.htm

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Environmental Quality Incentives Program Benefit Cost Analysis

Executive Summary

BACKGROUND

Pursuant to Executive Order 12866, Regulatory Planning and Review, the Natural Resources Conservation Service has conducted a benefit cost analysis of the Environmental Quality Incentives Program as formulated for the proposed rule. The Department of Agriculture Reorganization Act of 1994 and the Unfunded Mandates Reform Act of 1995 also require analysis of costs, benefits and risks associated with major regulation. These requirements provide decision makers with the opportunity to develop and implement a program that is beneficial, cost effective and that minimize negative impacts to health, human safety and the environment.

The analysis estimates EQIP will have a beneficial impact on the adoption of conservation practices and, when installed or applied to technical standards, will increase net farm income. In addition, benefits would accrue to society for long-term productivity maintenance of the resource base, reductions in non-point source pollution damage, and wildlife enhancements. As a voluntary program, EQIP will not impose any obligation or burden upon agricultural producers that choose not to participate. The program was authorized at $6.16 billion over the six-year period of FY 2002 through FY 2007, with annual amounts for the base program and the ground and surface water conservation provisions increasing to $1.36 billion in FY 2007 after the initial authorization in FY 2002 year of $425 million. In addition, the 2002 Act authorizes a total of $50 million for the Klamath Basin in California and Oregon.

Prior to the promulgation of the Environmental Protection Agency's "National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations" (EPA CAFO) final rule which was published on December 15, 2002, NRCS estimated that 63 million acres of agricultural land will be treated over the six years of the program, including 44 million acres of cropland, 10 million acres of grazing land (pasture and rangeland), and 9 million acres for wildlife. The total evaluated on and off-site environmental benefits were projected to be $6.8 billion including $3.6 billion from animal waste treatment and $3.2 billion from land treatment. Some of the off-site environmental benefits are attributable to improvements made to enhance freshwater and marine water quality and fish habitat, improved aquatic recreation opportunities, reduced sedimentation of reservoirs, streams, and drainage channels, and reduced flood damages. Additional benefits are from reduced pollution of surface and ground water from agrochemical, improvements in air quality by reducing wind erosion, and enhancements to wildlife habitat.

This analysis was conducted prior to the promulgation of the EPA CAFO final rule. The CAFO rule was published on December 15, 2002 and it underwent changes up to the time of promulgation. As a result, this analysis could not accurately separate the benefits and costs associated with the CAFO rule and those associated with the EQIP proposed rule. There is still some flexibility in the EPA CAFO rule relative to which facilities will be required to have an National Pollutant Discharge Elimination System (NPDES) permit. However, it is known that the CAFO rule will apply to all facilities with more than 1,000 animal units (AUs). Since the CAFO rule claims the environmental benefits for controlling pollution on these facilities, the EQIP rule cannot make the same claim. EQIP will be a primary vehicle for funding compliance with the CAFO rule transferring some of the funding obligations from producers to EQIP so the costs associated with implementing the required pollution control measures apply to EQIP.

This analysis will be revised to take into account comments received during the Proposed Rule comment period. During this revision, a full review of the overlap of the costs and benefits associated with the CAFO and EQIP rules will be undertaken. Meanwhile, it is estimated that approximately $1.7 billion in annual benefits that were identified in the EQIP economic analysis can be attributed to the EPA CAFO regulation. Consequently, total EQIP benefits are $5.1 billion and net benefits relative to EQIP funds are $620 million and net benefits relative to total costs of -$1.5 billion.

METHODOLOGY

In developing the benefit cost analysis for EQIP, it was necessary to identify a baseline for comparison. Since EQIP was created in 1996, the regulation and policy guidance for implementing that version was considered a baseline. In addition, changes to EQIP, as outlined in the 2002 Farm Bill, have been implemented via a Notice of Fund Availability (NOFA) issued in fiscal year 2002. This version of the program was also used as a basis for comparison; hence a two-tiered approach to the cost-benefit analysis. In order to estimate potential program impacts, several alternatives or variations of EQIP as outlined in the NOFA have been evaluated. Costs and benefits have been quantified where possible. Costs and benefits that could not be adequately or accurately quantified are discussed qualitatively.

Public costs quantified in this analysis are the total technical and financial assistance outlined in Congressional Budget Office scoring of the 2002 Farm Bill. Private costs are out of pocket costs paid by producers based on average cost share rates of EQIP. The quantifiable benefits are a subset of the environmental benefits that accrue to the types of practices implemented with EQIP. Available data and literature were found which support benefits in the following categories:

- Reduction in sheet and rill reduction as predicted by the Universal Soil Loss Equation (USLE)
- Improved forage production on grazing lands
- Reduced wind erosion resulting in both improved air quality and reduced soil loss
- Increased irrigation water use efficiency
- Benefits of wildlife viewing and hunting resulting from improved wildlife habitat management
- Reduced fertilizer expense resulting from nutrient management practices not associated with animal waste
- Animal waste benefits:
    - savings resulting from decreased fertilizer purchases
    - increased recreational activity resulting from improved water quality
    - improved commercial shell fishing
    - reduced incidence of fish killings
    - reduced contamination of private wells

In order to conduct the analysis, it was necessary to make certain assumptions based on the available data.

- Practice mix for the old and new EQIP is the same.
- Quantifiable benefits and per unit benefits are constant, and all benefits are based on national averages.
- Technical assistance costs are based on the full workload and costs associated with implementing the EQIP program, and are based on a projected average contract size.
- Average annual and net present value calculations use an OMB-recommended discount factor of 7 percent.

DESCRIPTION OF ALTERNATIVES

Tier One

The baseline for comparison is the historical EQIP as established in the 1996 Federal Agricultural Improvement and Reform Act. The baseline reflects historical funding levels projected forward along with existing policy. Alternative One consists of EQIP as defined in the 2002 NOFA. The NOFA alternative reflects increased funding levels, no buy-down provision[4], the elimination of priority areas, and maximum payment limitation of $450,000, with a payment cap of 50 percent cost-share for any practices with an actual cost exceeding $100,000, and the inclusion of large confined animal feeding operations (CAFOs). These are the most significant changes in the program legislation in terms of economic costs and benefits.

[4] The buy-down provision of the old EQIP allowed producers to improve the offer index of their applications by reducing the amount of cost share funds they would expect.

Tier Two
For the second tier of the cost-benefit analysis, the baseline (EQIP 2002 Farm Bill as outlined in the NOFA) is compared to three alternatives. Comparison of these alternatives represents sensitivity analyses of potential policy impacts of EQIP implementation. The following is a brief description:

Alternative One - Varying AFO/CAFO funding allocation by size class
The first alternative is an analysis of various methods of allocating funds to animal feeding operations (AFO) and confined animal feeding operations (CAFO) based on the size of the operation. The specific scenarios evaluated were allocating funds equally to each size class, allocating funds according to the necessary treatment costs, allocating funds based on the total number of animal units, allocating funds based on the number of operations, and allocating funds only to middle or smaller size operations.

Alternative Two - Varying payment limitation between $50,000 and $450,000
Although legislation allows a maximum payment of $450,000 per participant, the analysis considered potential benefits if different payment limitations were allowed based on local market, cultural or economic conditions. Alternative Two analyzes the effects of payment limitations ranging from $50,000, up to the legislated maximum of $450,000.

Alternative Three - Varying methods of environmentally targeting funds
The third alternative analyzes the effects of different fund allocation methods which target natural resource issues and concerns. The methods are:

- Homogenous evaluation process (NOFA) - A standardized allocation formula is applied to every application in every location
- Spatial evaluation process - More points are given based on proximity to an identified natural resource (i.e. an impaired stream, underground aquifer, etc.), but no participants are excluded;
- Allocation and evaluation by natural resource concern - More points are given based on an identified natural resource concern, i.e. water quality, soil erosion, or wildlife habitat development
- Variable cost share rates - Rates vary by practice based on effectiveness or other criteria
- Allocation formula - Established criteria are evaluated based on a weighted formula
- Holdback option - Funds are set aside to be allocated at a later point to locations that achieved higher levels of program efficiency based on measures which have yet to be determined.

CONCLUSIONS

Tier One - Comparison of 1996 EQIP to EQIP as Outlined in the NOFA

The EQIP Benefit Cost Analysis compares the EQIP program created in 1996 ("old program") with those changes associated with the 2002 program implemented through the NOFA. Additionally, several alternatives associated with the proposed rule were then compared with the NOFA.

Based upon this analysis, if EQIP is implemented as described in the NOFA, it is estimated that 63 million acres of agricultural land will be treated, categorized by 44 million acres of cropland, 10 million acres of grazing land, and 9 million acres for wildlife habitat improvement if the proposed program is implemented. This results in $6.8 billion in total benefits, including $3.6 billion due to animal waste treatment and $3.2 billion due to non-animal waste land treatments.

The treatment level is expected to increase when compared to the old EQIP. An additional 0.9 million acres for sheet and rill water erosion (USLE) reduction, 2.3 million acres for wind erosion, 8.5 million acres for non-waste nutrient management, 9.6 million acres for net irrigation water reduction, 3.1 million acres for grazing productivity, and 4.1 million acres for wildlife habitat could be expected to occur on the landscape. In addition, 4.8 million animal units, and 2,755 animal feeding operations could be treated and total soil loss from agricultural land decreased by 7.5 million tons per year.

Under the assumption of the old program continuing at level funding and not accounting for the effects of the EPA CAFO rule, the net present value of benefits over the period of 2002-07 was estimated to be $2.2 billion with $0.3

billion coming from waste treatment and $1.9 billion from land treatment. Net benefits were $1.2 billion above EQIP funds and -$0.2 billion if total costs were accounted for.

Net benefits were $2.3 billion above EQIP funds and $0.2 billion if total costs were accounted for.

The difference between the net benefits estimates of the two scenarios is due to three factors:

- *scale effect* associated with increased funding;
- *practice mix effect* as a larger share of funds are allocated to livestock waste treatment and efficiencies; and
- *cost effect*, since with cost share buy down eliminated, the government cost per treated unit is most likely increased.

Analysis suggests that implementation of EQIP outlined in the NOFA would provide substantial benefits and would help achieve program objectives of solving identified natural resource concerns while optimizing environmental benefits.

The option to include large AFOs, elimination of priority areas and discussion of increased payment limitation are discussed in detail in Tier Two of the benefit-cost analysis. Other proposed changes in EQIP are not quantified in this analysis due to lack of available data necessary to accurately evaluate effects. These include potentially shorter average contract lengths due to the fact that single practices will be allowed and contracts may terminate one year after completion of the last practice, allowing multiple contracts per tract of land, and providing higher cost share rates for limited resource producers or beginning farmers.

Tier Two - NOFA Compared to Policy Options

Alternative One: Alternatives to AFO/CAFO Funding
This analysis was generated before EPA has promulgated the CAFO rule, which regulates all large AFOs above 1,000 AUs. With the promulgation of this rule, EQIP can no longer claim environmental benefits from treatment of large producers, since they must comply with CAFO regulations. Use of EQIP resources would therefore be most efficiently used in treating the next largest non-regulated class of producers.

Allocating funds based on share of total animal units (AUs) results in 42 percent of the funding going to the largest size class (>1000 AUs), and achieves the greatest net benefits of $2.03 billion and $1.02 billion for EQIP funds and total costs. Conversely, the allocation based on share in numbers of operations, the largest size class would only receive 4 percent of the funding and would achieve net benefits of $378 million and $-315 million for EQIP funds and total costs, respectively. Clearly, some efficiencies are lost due to the fact that it costs more per animal unit to treat the smaller size class AFOs than the large farms.

The strategy generating the highest net benefits (of the six alternatives evaluated) is to allocate the funds across the size classes according to their proportionate share in total number of AUs. That strategy would result in treatment of 15.8 million AUs, compared to as low as 9.4 million AUs for the strategy with the lowest net benefits (allocation divided evenly to the 3 smallest size classes and excluding funding to CAFOs.) The more that funds are shifted towards the larger AFOs, the larger the number of AUs treated, the lower the TA cost, and the greater the estimated benefits.

By comparison, if farms with greater than 1000 animal units remained excluded from EQIP funding for animal waste practices, a total of 11,400 farms, with a total of 23 million animal units, and an overall need of $500 million in CNMP costs would remain ineligible for EQIP funding. . In the scenario of not funding large CAFOs, this analysis shows that although net benefits would exceed the net EQIP costs, net benefits would be the lowest of all scenarios, with $314 million for EQIP funds and $-421 million for total costs.

Under the NOFA scenario, this analysis assumed that the 50 percent of EQIP funding designated for animal waste treatment would be divided equally across the four AFO size classes. However, from the total EQIP benefits, the benefits accruing from treatment of the largest class of AFOs, greater than 1,000 AUs, are excluded. This exclusion is appropriate now that the Environmental Protection Agency has formally published its revised CAFO rule and the benefits from treatment of those large AFOs are credited to the CAFO rule rather than the EQIP program. The definition of AFOs governed by the new CAFO rule has a broader reach than the simple "greater than 1000" class

defined in this analysis. At this time, the extent to which the CAFO regulation covers small and medium sized AFOs is unclear, and assumes that the coverage is not significant.

Alternative Two: Payment Limits Between $50,000 and $450,000
Although actual payment depends on the specific conservation system applied and the cost share rate, an assumed or artificial limit on payments can be used to analyze comparative environmental benefit. Data in the benefit-cost analysis suggests that while the various payment limitations do not have great bearing on the total number of farms that would be affected by the caps, a significant number of animal units could be eligible for funding without payment limitations at the higher cap levels.

At the $450,000 payment limitation level, only 1% of the remaining livestock farms would still be capped in the costs of implementing animal waste-related conservation practices. However, those large farms control 27 percent of the animal units. These represent the largest farms with the highest total costs, but lowest cost per animal unit.

Although there are relatively few additional farms that would be funded as payment limitations increase, these farms have a large number of animal units. Increasing the payment limitation from $50,000 to $100,000 would allow an additional 9 million animal units to be eligible for funding under the payment limitation. Increasing the payment limitation from $300,000 to $450,000 would only increase the number of animal units by fewer than 3 million.

At $50,000, only 33 percent of the livestock farms' animal units would be eligible for funding without reaching the cap. At $100,000, half of the nation's animal units would qualify for EQIP funding without reaching the cap, and at the $450,000, almost three quarters of the nation's animal units would qualify for EQIP funding without reaching the payment limitation cap.

Although legislation allows a maximum payment of $450,000 per participant, it is assumed that the Agency and states may set lower limitations if necessary based on local market, cultural or economic conditions. The economic analysis indicates, there is no economic gain associated with imposing lower payment limitations. Since the larger farms represent those with the highest number of animal units and greatest cost efficiencies per animal unit, the program benefits by allowing full participation up to the payment maximum.

Alternative Three: Alternative Application Evaluation Procedures to Ensure Cost-Effective, Environmentally-Targeted Fund Allocation
Under the previous program, 65 percent of funds were allocated to specially-targeted, geographically-targeted areas. The NOFA/Proposed Rule eliminates the process of designating funds to conservation priority areas. There is concern that this will have a negative impact on the potential environmental benefits due to the fact that funds may not be targeted to specific geographic areas, and the environmental effects of practice implementation will be diluted by scattering cost share assistance over a much broader area.

Six options for environmentally targeting EQIP funds were compared in this alternative. Results of these comparisons indicate that if technical assistance costs are constant, then adopting some form of spatial evaluation, varying cost share by practice effectiveness, or allocating funds with a formula based on priority resource concerns could all have positive effects on total benefits.

In the case of varying fund allocations to emphasize a particular resource concern, the share of total funds allocated in the NOFA was increased by 5 percent for one category and decreased by 1 percent for the other benefit categories identified in this analysis, with the exception of animal waste. The results of these changes indicate that targeting non-animal waste related nutrient management concerns would yield the greatest net benefits above total costs ($673 M), compared to net benefits of $180 Million for the NOFA. When compared to the NOFA, net benefits would increase respectively for each category that was emphasized using the set percentages. When compared to the NOFA, total net benefits would decrease if grazing land productivity or wind erosion categories were to receive an increased share of funds. Although targeting by resource concern can have overall positive effects on benefits, emphasizing one particular resource concern may overlook the relationships between natural resource effects, and fail to capitalize on them.

In the case of varying cost share levels by practice, the National priorities are emphasized by reducing the cost share rates for practices that have primary impacts in the other benefit categories. For purposes of this analysis, it is assumed that the average cost share for EQIP is 75 percent in the NOFA. This rate is decreased to 60 percent (mild) and to 50 percent (aggressive) for erosion reduction, grazing productivity, and wildlife habitat improvement. The results indicate that pursuing National priorities with a cost share mechanism can increase total benefits by 5 percent in the "mild" scenario, and by 8 percent for the more aggressive scenario. This rule allows flexibility at the state

level to provide higher cost-share rates for practices that impact local resource concerns while reducing cost-share rates for practices that do no optimize benefits at the local level.

In addition to these methods, a holdback of funds for distribution based upon an objective comparison of States using performance criteria can be a useful tool that could increase net benefits and increase program efficiency. Data suggests that in spite of the removal of the requirement for geographically based priority areas other approaches to targeting of EQIP funds to the most critical natural resource concerns are feasible and will have positive effects on total program benefits. This will ensure that environmental benefits are optimized and program objectives are met, but without excluding participation by persons outside of a designated boundary.

NRCS will revise and enhance this analysis for the final rule. Future analysis will seek to evaluate alternative allocations of program dollars across different conservation practices and quantify and estimate their impacts.

To better implement the program to optimize environmental benefits, as required by the 2002 Act, NRCS seeks public comment, data, or references that can quantitatively or qualitatively enhance its analytical efforts. NRCS especially welcomes comments or data on levels or trends in conservation technology adoption, the on-site and off-site environmental benefits and economic returns to various conservation practices, and other literature about incentive schemes for technology adoption.

Introduction

Legal Citation

The Natural Resources Conservation Service (NRCS) is promulgating a regulation to implement the Environmental Quality Incentives Program (EQIP), authorized by 16 USC 3830aa et seq. EQIP was authorized by the Federal Agriculture Improvement and Reform Act of 1996, P. L. 104-127, (April 4, 1996) ("the 1996 Act"), and was recently amended by the Farm Security and Rural Investment Act of 2002, P. L. 107-71 (May 13, 2002) ("the 2002 Act"). The 2002 Act resulted in changes to the program that are discussed in this document, and includes a provision that requires the Secretary of Agriculture, within 90 days after the enactment of the 2002 Act, to promulgate regulations necessary to carry out the program.

Need for action

Consistent with Congressional authorization, there is a need for NRCS to implement the conservation provisions found in 16 USC 3830 aa et seq of the EQIP program in a manner that enhances the States authority and flexibility while ensuring that all statutory requirements of the legislation are met. The few discretionary decisions made at the national level are focused on maintaining program integrity and ensuring consistency and fairness in carrying out the agency's program responsibilities.

(a) The analysis and disclosure in this Benefit Cost Analysis is intended to allow the Responsible Federal Official, which is the Chief of NRCS, to determine whether the promulgation of the amendments to the EQIP regulation adheres to the following principles, as outlined in E.O. 12866 and USDA DR1512-1, with consideration to OMB guidance.

Precedents and Context

Current Land Use

The Nation's private lands constitute a tremendous resource that yields food and fiber as well as the livelihood and recreation for private land users.

Major agricultural uses of land in the U.S.

Cropland	377 million acres
Pastureland	120 million acres

Rangeland	406 million acres
Hayland	Included in cropland
Forestland	407 million acres
Other lands (homesteads, feedlots, etc.)	84 million acres [1/]

1/ Includes lands in the CRP that are not cropped and currently under vegetative cover.

Source: USDA-NRCS, 1997 National Resources Inventory; Revised December 2000

Many of these lands have resource problems and limitations that decrease their productive use, cause damages, and reduce efficiency in the agricultural sector. While natural resource problems on private lands are well documented elsewhere, three cases illustrate the current problem situation:

- The 1992 National Resources Inventory indicates that more than 125 million acres of cropland and rangeland have annual rates of sheet and rill erosion that exceed "T", the soil loss tolerance rate at which a soil can be maintained indefinitely. Also, 115 million acres of cropland and rangeland have annual rates of wind erosion that exceed "T". Some of these lands are vulnerable to both types of soil erosion, so the quantity of acres eroding in excess of "T" may be less than the sum of the acreage amounts.
- The 1994 EPA assessment of the Nation's surface water quality by States indicates that 36 percent of assessed miles of rivers and streams were impaired, and 60 percent of these were affected by agricultural non-point source pollution. Of lakes, 37 percent of assessed acres were impaired, and 50 percent of these were affected by agricultural non-point source pollution. A slightly lower rate, but similar pattern existed for estuaries.
- A significant evolution has occurred in the livestock production sector that increases the challenges for dealing with animal waste. A June 1995 briefing report by the General Accounting Office for the Senate Agriculture Committee outlines the patterns of change. These patterns indicated that animal manures are significant sources for nitrogen inputs to watersheds in the regions of the U.S. and that consolidation trends and geographical shifts in animal production are occurring for some portions of the industry, particularly for hog operations as well as for turkeys. Some analyses suggest that risks of contamination of surface waters from fecal coliform bacteria require attention.

Situations where Government Action Can Generate Environmental Benefits

Based on past program experience, potential environmental benefits may be generated from four different classes of situations:

- The first groups are the negative externalities cases where agricultural production otherwise results in environmental damage that imposes no mitigation of costs on the producer and for which the producer is not otherwise held accountable;
- The second groups are cases where increased conservation management would produce both on-site (farm income) benefits and environmental benefits, but where subtle cost considerations inhibit adoption;
- The third groups are opportunities for environmental benefits from land use management changes where private costs exceed private benefits, i.e., positive externalities;
- The fourth groups are situations that enable farmers to meet regulatory requirements while continuing production. This is especially important for some specialized crops and in some areas where established livestock farmers are under regulation pressures due to increasing animal concentrations. These cases are discussed in detail below under separate subheadings.

In all the cases discussed above, Government programs will generally have a positive benefit cost ratio. Except for some specialized cases (discussed in the 1997 EQIP Benefit/Cost Analysis), competition for the program benefits will tend to result in producers asking for assistance only sufficient to cover their private costs. EQIP will enable private landowners and society to experience benefits by overcoming these impediments.

Overview of Expected EQIP Benefits

EQIP provides funding for a variety of conservation practices on agricultural land and animal feeding operations (AFOs). These practices result in a mixture of environmental improvements in the areas of water quality and quantity, wildlife habitat, air quality, soil health, and aesthetic values. The practices may also generate on-site productivity benefits for the producers, as input use and production costs are decreased, and yields and resource quality are enhanced. However, neither the methodology nor availability of collected data is sufficient for imputing a monetary value to many of these benefits. For many environmental quality attributes the methodology for adequately measuring or estimating a physical change is not well developed. Consequently, numerical estimates could be developed for only a few of the benefits that are expected to come from the EQIP program. Estimates of the following on-site benefits accruing to producers were also included in the assessment:

- Reduced yield productivity losses due to lower rates of erosion;
- Value of increased forage yields from grazing land improvements;
- Reduced irrigation costs as efficiency improvements are made; and
- Savings from reduced fertilizer purchase, both from more efficient fertilizer use and from enhanced management of manure applications;

For off-site benefits the following categories were included:

- Reduction of the cost of removal or mitigation of sediment accumulation;
- Reduction in the cost of removing nutrients and mitigating the effects of algae growth from domestic water supplies;
- Increased recreation value associated with cleaner water and improved wildlife habitat;
- Reduction in damage to fisheries due to water pollutant; and
- Increased availability of irrigation water for transfer to other users as irrigation efficiency is improved.

First, the practices historically funded by EQIP were categorized according to the type of benefits that they are expected to produce. Then for each categorical set of practices, on a per-unit of land or livestock treated basis, the average cost of treatment and the expected environmental benefit were calculated. This procedure assumes that the proportional mix of practices historically funded by EQIP for each resource benefit category will continue into the future. An adjustment was made for an expected larger portion of the funding to be devoted to assisting producers to develop and implement Comprehensive Nutrient Management Plans (CNMPs). With these per-treated unit costs, physical effects, and per unit environmental benefit values found in published literature, projections of the number of units to be treated with the new EQIP program, and the associated benefits and costs were made.

Although this approach is straightforward, there are definitely complex issues and subtleties involved in the process. USDA commissioned an independent study of the effectiveness of the assessment processes used in 1996 for EQIP and the Conservation Reserve Program (CRP) (USDA 1997a and 1997b; Powell and Wilson, 1997). That study noted:

- Many of the assessment endpoints were too diffuse or ill-defined to provide an adequately sharp characterization of the benefits that may be expected from implementation of the two programs. Two reasons for this lack of clarity were apparent. First, Congress presented the Department with a large, un-prioritized set of objectives for the two programs. Frequently, these multiple objectives are conflicting, and at a minimum, they are competing. Further, little appears to be known concerning the public's priorities for environmental improvement and natural resource conservation.
- The natural resource scientific and professional community lacks conventional tools and models for linking things that they can measure with precision in the field or lab to many environmental resource values that may be impacted by agricultural activities. This is particularly true when natural variability in conditions is high and when impacts are cumulative over large geographic scales and extended periods of time.

Even with 5 years of EQIP program implementation data available, analysts still face the same issues as they did in 1996. Also, during that same period, Government agencies were under pressure to streamline program implementation procedures, in particular, to reduce the paper work burden on both landowners and local Government offices. Consequently, data forwarded to the national program office includes only the number of units of treatment and costs of treatment. Offsetting this lack of data to some extent is an increase in computer capability,

development of additional models of environmental phenomena and understanding of the relevant phenomena, and availability of other survey data.

Estimation of Non-Point Source Water Pollutant Benefits

This assessment is weighted quite heavily toward the benefits expected to accrue from the EQIP practices reducing non-point source water pollution (NPS) since the methodology has been advanced further in that area of EQIP type benefits than for other benefits. By definition, with NPS sources, the individual effects of management actions on each resource unit cannot easily be linked to measurable changes in environmental attributes of nearby water bodies (Ribaudo and Hellerstein, 1992). Also, the relationship between pollutant emission from the land and an environmental attribute is often cumulative and variable over both time and location. For instance, on the cropland in a particular watershed excess nutrients and displaced soil particles may accumulate over several years in deposition areas on or off the agricultural fields, before being suddenly flushed into a water body by a single large storm event. That storm event moves some of the soil particles, deposits some along the way, and newly detaches other soil particles in the drainage way. Consequently, analysts predict that 1) certain practices have prevailed in the watershed and 2) that a change in water quality has happened. But linking of the sediment in the water body to a specific source acre is generally not possible. Weather variation throughout the year results in a probability that with even careful agricultural management, a normal (or an abnormal) precipitation event may occur at a time when nutrients and exposed soil are available for movement off the landscape.

Claassen et al., 2001, p. 63 describes the methodology used in this analysis. Our approach is to project the number of units (acres or animal units) treated and apply average values of benefits where such values have been estimated in earlier studies. For example, a practice to address sheet and rill erosion would aggregate the tons of soil loss avoided and apply a per ton value, based upon earlier studies of the value of avoided erosion. Unfortunately, many practices known to provide benefits do not lend themselves to quantification. Therefore, it is only possible to evaluate the benefits of a few practices.

A series of studies over the last two decades have produced fairly well accepted estimates of the benefits for reducing soil erosion on a per-acre or per-ton basis. These estimates can be applied directly to some of the acre and practice changes projected for EQIP. Other studies have linked changes in valuation of an environmental attribute for a given purpose to changes occurring in land management over a larger time span or larger area. For example, in a given location, scientists may have estimated the change in recreational value of surface water quality for a period during which management practices were being changed. Those estimates can be proportionately applied with EQIP data, for cases where EQIP results in a similar, but different spatial or temporal scale, change in practices and surface water quality. For instance, EPA estimated the water quality benefits of treating all CAFOs (U.S. E.P.A. 2001). If the EQIP program treats e.g., a number of animal units in AFOs equal to 5% of the animal units treated in the EPA CAFO study, then the EQIP benefits might be approximately 5% of the EPA estimate.

This approach to environmental benefit valuation relies on the concept of "benefit transfer" (Krupnick 1993 and Piper 1998). The benefit transfer concept allows use of the environmental benefits either estimated or measured in one situation to be used in place of independent estimates or measurements in a similar situation. The most important consideration is the extent to which the conditions under which the original values were obtained is similar to the situation for which the values are to be used.

Brief history of EQIP

EQIP was established in Title III of the Federal Agriculture Improvement and Reform Act of 1996 (FAIRA) and placed within the Conservation Title of the 1985 Food Security Act. EQIP combines into a single program the functions of four previous incentive-based programs: the Agricultural Conservation Program (ACP), the Great Plains Conservation Program (GPCP), the Water Quality Incentives Program (WQIP), and the Colorado River Salinity Control Program (CRSCP). EQIP is a voluntary program providing cost sharing, incentive payments, technical assistance and educational assistance to producers who adopt conservation systems that protect and improve the quality of natural resources.

- USDA DR 1512-1, Regulatory Decision making Requirements[5]

[5] USDA DR 1512-1, Regulatory Decision making Requirements, http://www.usda.gov/ocio/directives/DR/DR1512-001.pdf

- USDA Departmental Policy for the National Environmental Policy Act[6]
- USDA Departmental Policy on Environmental Justice[7]

Funding

The regular EQIP Program was rolled out during 1997 with funding authorized at $200,000,000 annually. Included in the funding authority was financial assistance to producers and technical assistance for agency implementation of the program. Technical assistance for program implementation was ten percent of the total funding in Fiscal Year 1997, and no more than 19 percent each year thereafter.

Summary of EQIP Program Funding and Contracts by Fiscal Year[8]

ITEM	Fiscal Year 1997	Fiscal Year 1998	Fiscal Year 1999	Fiscal Year 2000	Fiscal Year 2001
Applications from Producers	73,427	79,044	67,563	53,538	47,461
Total Funds Available	$200 million	$200 million	$174 million	$174 million	$200 million[9]
Financial Assistance Requested	≈$512.7 million	≈$578.6 million	≈$482.1 million	≈$401.8 million	≈$
Contracts Funded	24,592	20,100	18,486	16,164	17,389
Contract Acres	8,633,234	9,278,480	8,730,308	7,459,689	8,544,465
Average Contract Acres	351	462	472	462	491
Financial Assistance in Contracts (Obligated)	$173,602,398	$152,418,829	$133,813,496	$131,848,319	$151,470,821
Average Contract Cost	$7,059	$7,583	$7,239	$8,157	$8,711

Funding was allocated to States using a formula taking into account numerous variables. The formula was determined by an interagency team and was an attempt to fairly distribute funds to states based on conservation needs and resource pressures. Funds allocated to States were normally received in the Farm Service Agency (FSA) State Offices during the second quarter, and were available for developing contracts for the remainder of each fiscal year.

[6] USDA Departmental Policy for the National Environmental Policy Act, 7CFR Part 1b, 1997, http://www.nhq.nrcs.usda.gov/BCS/enviro/7cfr1b.pdf

[7] USDA Departmental Policy on Environmental Justice, 5600-002, December 15, 1997, http://www.nhq.nrcs.usda.gov/BCS/enviro/7dr1b.pdf

[8] Data through June 2001 obtained from FSA System 36 records.

[9] Includes a supplemental allocation to EQIP of $26 million.

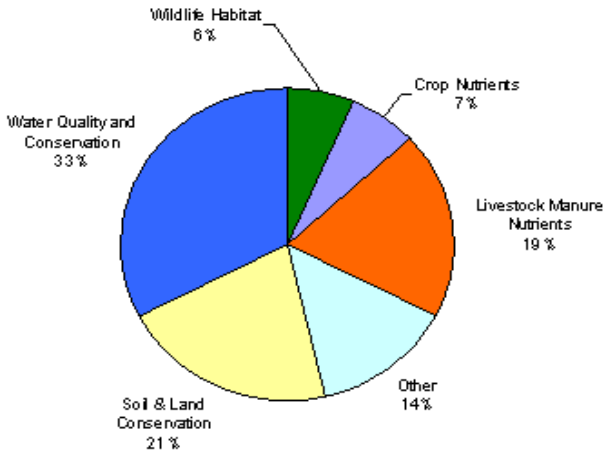
EQIP Program History Quick Facts

ITEM	FY 1997	FY 1998	FY 1999	FY 000	FY 2001	TOTALS
					(10/1/00 to 6/30/01)	(Through 6/30/01)
Applications from Producers	73,427	71,060 new apps, + 7,984 deferred apps	59,038 new apps, + 8,525 deferred apps	43,288 new apps, + 10,250 deferred apps	39,149 new apps, + 8,312 deferred apps	285,962
Total Funds Available	$200,000,000	$200,000,000	$174,000,000	$174,000,000	$199,942,800	$947,942,800
Financial Assistance Requested	≈$512.7 million	≈$578.6 million	≈$482.1 million	≈$401.8 million	≈$	~$
Contracts Funded	24,592	20,100	18,486	16,164	17,389	96,731
Contract Acres	8,633,234	9,278,480	8,730,308	7,459,689	8,544,465	42,646,176
Average Contract Acres	351	462	472	462	491	441
Financial Assistance in Contracts (Obligated)	$173,602,398	$152,418,829	$133,813,496	$131,848,319	$151,470,821	$743,153,863
Average Contract Cost	$7,059	$7,583	$7,239	$8,157	$8,711	$7,683
Estimate of Leveraged Dollars			$134,669,756 (Prod. contribution approx. 42%			
Payments Made to Producers (as of 10/2/2001)	$108,655,930	$89,576,922	$64,420,333	$40,256,176	$181,021	$303,090,382
Priority Areas Approved at State Level & Proposed for Funding	608	1,300	2,461	2,463	2,463	2,463
Priority Areas Funded	475	686	780	816	865	1,381
Percent of Funds Expended in:						
Priority Areas	68.8%	74.3%	85%	73.4%	≈ 73%	72.9%
Statewide Concerns	31.2%	25.7%	15%	26.6%	≈ 27%	27.1%
Technical Assistance Allocated	$20 mil (10%)	$38 mil (19%)	$33 mil (19%)	$33.06 mil (19%)	$37.99 mil (19%)	$162.05 mil (17%)
Financial Assistance Allocated	$175 mil (87%)	$157 mil (78%)	$137.14 mil (78%)	$132.04 mil (78%)	$159.85 mil (80%)	$761.03 mil (80%)
Education Assistance Allocated	$5 mil (2%)	$5 mil (2%)	$3.8 mil (2%)	$4 mil (2%)	$2 mil (1%)	$19.8 mil (2%)

Resource Concerns Addressed

EQIP's flexibility in addressing a broad set of natural resource concerns is highlighted by the distribution of approved funds for conservation practices. At the national level, one third of EQIP-funded activities involve water-related conservation practices ranging from more efficient irrigation systems to livestock drinking troughs. Soil erosion and land management practices account for 21 percent of funding, followed by livestock nutrient management with 19 percent of funds. The remaining 27 percent is accounted for by practices addressing wildlife habitat management, crop nutrient management, and other concerns. Funding is presented according to the main environmental concern associated with implemented practices; however, in reality many practices address multiple concerns. Here, only the main concern addressed is taken into consideration.

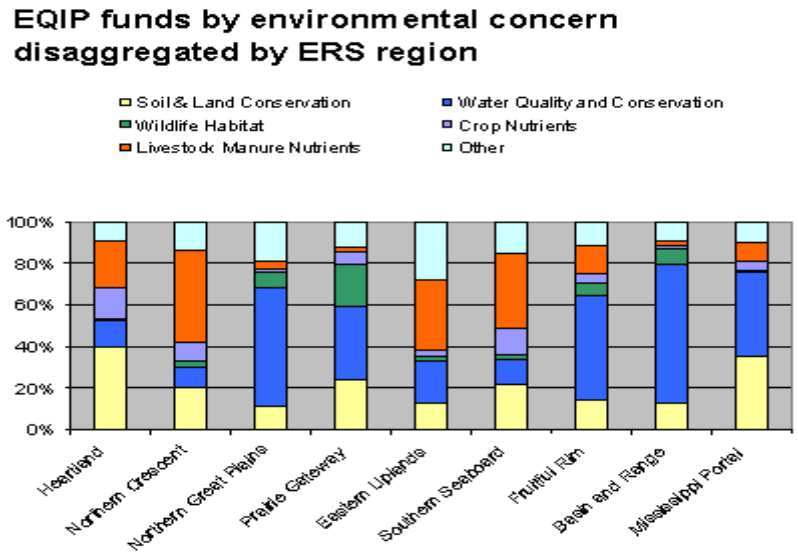
Distribution of EQIP funding by environmental concern, FY1997-2000



There is considerable variation around the country in terms of the environmental concerns being addressed by EQIP. Its environmental targeting is best observed at the level of the ERS Farm Resource Regions[10]. For example, livestock waste management practices obtain the lion's share of EQIP funds in the Northern Crescent, Eastern Uplands, and Southern Seaboard regions, where there are overriding concerns surrounding these issues.

These are indeed regions where there is a considerable excess of phosphorus and nitrogen from livestock production. However, the presence of excess nutrients does not always result in EQIP funding for livestock manure management. In the Prairie Gateway, which has substantial excess on-farm nutrients from confined animal operations, only 2 percent of EQIP funds are spent on livestock waste management. Livestock operations in the Prairie Gateway are large custom cattle-feeding operations with very little land, and therefore have little use for nutrient management practices aimed at employing nutrients on farm. Further, most operations in this region have more than 1,000 AU, such operations were ineligible for EQIP cost-shares for waste storage or treatment structural practices under the 1996 Farm Bill.

[10] A map of the ERS regions can be found at:
http://www.ers.usda.gov/Emphases/Harmony/issues/resourceregions/resourceregions.htm



In the Western United States, where there has historically been concern about water resources, the majority of EQIP funds are allocated to practices involving water resource management (see data on EQIP expenditures). The Northern Great Plains, Basin and Range, Fruitful Rim, and Prairie Gateway all have water quality and water conservation as the main components of EQIP expenditures. Similarly, in the Heartland, Mississippi Portal, Prairie Gateway, and Southern Seaboard, where much land is subject to soil erosion, EQIP funds are largely used to prevent soil erosion.

EQIP Features and Progress Prior to 2002

Priority Areas

Priority areas were introduced in the 1996 Farm Bill to direct limited conservation funds to areas of greatest environmental concern. This means of targeting funds toward local resource concerns played an important role in increasing cost-effectiveness of environmental improvements mandated for EQIP. In general, priority areas were defined as watersheds, regions, or areas of special environmental sensitivity or having significant soil, water, or related natural resource concerns. However, EQIP could address additional significant statewide concerns that may occur outside designated priority areas. A program goal was to use at least 65 percent of the funds in designated priority areas and use up to 35 percent for other significant statewide natural resource concerns. Additional emphasis was given to areas where State or local governments offered additional financial or technical assistance and where agricultural improvements would help meet water quality and other environmental objectives.

Priority areas were determined by a process that begins with local work groups. These local work groups, convened by local conservation districts, conducted a conservation needs assessment and, based on that assessment, developed proposals for priority areas. These proposals were submitted to the Natural Resources Conservation Service (NRCS) State Conservationist, who selected those areas within the State based on the recommendations from the State Technical Committee (which includes professional resource managers representative of a variety of disciplines in natural resources sciences). Ideally, understanding the problems and their causes within these priority areas provided focus to program strategies that might be employed, as opposed to a more general, geographically broader targeting.

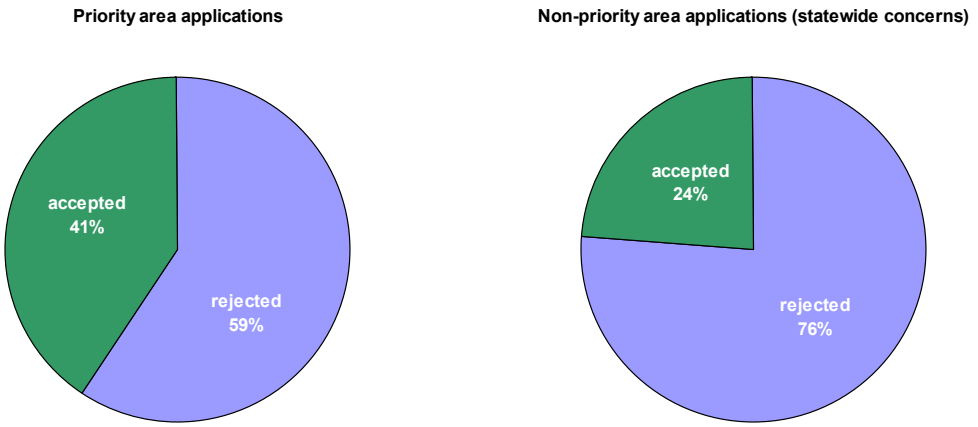
Although some visible signs of an improvement in overall watershed health may have been apparent, many environmental experts feel that a five-year period is insufficient time to determine whether improvements are due to long-term changes in watershed conditions or due to short term aberrations in normal weather

patterns. The actual environmental improvements due to the EQIP program are therefore difficult to measure in terms other than modeled erosion, sediment, and phosphorus loading reductions.

Nearly 1400 EQIP Priority Areas were approved and funded during the five-year period 1997-2001. Total funds allocated to Priority Areas averaged almost 73 percent of the total financial assistance available. While this disparity in fund distribution led to some dissatisfaction among producers who were not located within the geographic Priority Areas, environmental targeting of EQIP funds to address the most pressing natural resource concerns was accomplishing the goal of funds were being directed to those areas most in need of conservation funds (as determined by NRCS in collaboration with local work groups). This was done while at the same time it allowed program flexibility for funding important Statewide concerns for land that was not part of a priority area. Table 7 in Appendix 2 shows the crop and pastureland acres of these priority areas. The maps in Appendix 4 provide more details.

From the producers' perspective, being inside a priority area made a difference in terms of the likelihood of obtaining funds through EQIP. Given that at least 65 percent of EQIP funds were earmarked for priority areas, applications inside priority areas were more likely to be accepted. From FY 1997 to 2000 there were approximately 250,000 applications of which 51% were in priority areas and 49 percent related to statewide environmental concerns. Even though the applications were equally distributed between priority areas and land outside of priority areas, a much larger share was accepted inside priority areas (41 percent) compared to outside priority areas (24 percent). The analysis in appendix 2 shows that, at least for erosion reduction, the more selectively funded contracts outside the priority areas may have greater erosion reductions that the funded applications inside the priority areas.

Priority Area Application Acceptation Rates



Resource Needs Assessment

Local Work Groups (LWG) with memberships which could be made up of Federal, State, and local conservation agencies, environmental groups, agricultural producers, and agribusiness representatives convened to determine areas within each county, or multi-county area that need targeted conservation activity. The LWG then inventoried resource problems, conservation needs, determined producer interest and participation, and estimated proposed project outcomes. The LWG forwards these assessments to NRCS at the State level for review by the State Technical Committee. State Technical Committees make recommendations to the NRCS State Conservationist on which priority areas to fund, and funding levels. The State Conservationist makes the final decision, with required concurrence from the Farm Service Agency (FSA).

Assistance outside Priority Area

Discussions and input from the State Technical Committees are also crucial in determining the resource needs that should be addressed with the remaining EQIP funding through the statewide concerns portion of the program. In many States, the limited remaining funding necessitates reducing the list of eligible practices to a few key practices that will provide the most environmental benefit per dollar expended. Practice eligibility, cost share rates, and incentive payment levels are set at the State level by the NRCS State Conservationist with concurrence from the FSA State Committee.

Payment Limitations

The EQIP program previously limited payments for any contract to $50,000 per producer per contract. This limitation also applied to contracts on multiple tracts of land. A multi-person contract may exceed $50,000 in total. In addition, EQIP cost share payments were limited to a total of $10,000 per year. The per-year limitations may be waived under certain circumstances. When producers met those conditions, they normally had the $10,000 annual limitation waived.

Large Confined Livestock Operations

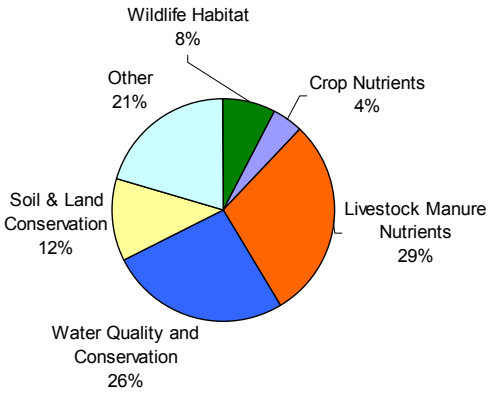
Under the prior EQIP program, large confined livestock operations (defined as those operations with more than 1,000 animal units) were not eligible for cost sharing on waste management facilities. All animals at all locations operated by the producer were counted (not just the tract where the animal waste facility was to be located) when determining whether or not the producer was over this limit. A producer with more than 1,000 animal units was still eligible for cost sharing for practices other than waste management facilities through EQIP.

Livestock Related Practices

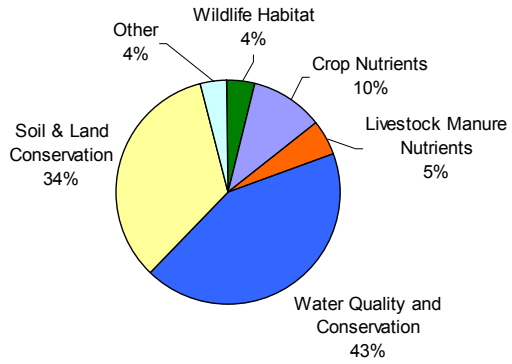
EQIP was the only USDA conservation program that contained an explicit clause targeting funds to address environmental concerns arising from livestock production. Nationally, at least 50% of EQIP funds had to be employed for natural resource concerns related to livestock. In FY1997-2000, EQIP directed approximately 60 percent of available funds to livestock producers as part of approved conservation plans. Of the funds involving livestock producers, approximately 55 percent were spent directly on waste management and water quality conservation practices, the rest being subdivided between wildlife habitat, land management, and other miscellaneous practices. The reason “Other” concerns was so large for livestock producers, is that they included the installation of fencing which accounted for a considerable share (11 percent) of EQIP funds provided to livestock producers.

Distribution of EQIP funding by Environmental Concern by Livestock/Non-Livestock Producers

Livestock producers:
Distribution of EQIP funding by environmental concern



Non-livestock producers:
Distribution of EQIP funding by environmental concern



Although EQIP specifically required that 50 percent of program funds be used for livestock related concerns, in practice this meant that if a producer was determined to be a livestock producer, all practices on that farm were considered livestock related. This view is justified on the basis that all on farm practices contribute to the economic viability of the livestock operation. Currently available data indicates that approximately 60 percent of available funding nationwide went to livestock enterprises.

Other producers may have been involved to some degree in livestock production. Even though the largest EQIP expenditures for these producers were linked to water and soil concerns, a small share did go to livestock nutrient management practices. Accounting for livestock-related practices being implemented by producers for whom livestock was a marginal activity, the percentage of total EQIP funds being directed towards livestock-related activities was 62 percent. A substantial share of such funds went to practices directly related to livestock waste management and water quality (accounting for 40 percent of all EQIP funds).

National Funding to State

Approximately $591 million had been allocated under EQIP from its inception until the end of FY 2000. The NRCS Deputy Chief for Programs (in concurrence with Farm Services Agency) allocated funds to the states using a formula that contained 29 resource and socio-economic variables considering:

(i) the environmental and natural resource conditions across the Nation;
(ii) recommendations from NRCS staff, Regional Conservationists, and members of the national interagency team; and
(iii) information contained in funding proposals.

Fund allocation by State is shown in the Appendix Table A1-1.

EQIP has also had an allocation specifically set aside for Native American nations amounting to 5 percent of the total available funds. The formula for the allocation of these funds for distribution has varied since inception, and the distribution is currently based on the acreage of tribally-held lands.

EQIP also provides funds for special emphasis each fiscal year for projects and activities deemed a national priority. Included are the Colorado Basin Salinity Control efforts, Salmon Habitat Restoration, and the Edwards Aquifer.

Application Evaluation

All applications received and found to meet requirements for program eligibility (eligible producer and eligible land) were ranked based on preset evaluation criteria. The ranking criteria used to evaluate applications were based on the principle of maximizing environmental benefits per dollar expended. This method of application evaluation also provided a predetermined set of criteria so that producers knew how they would be evaluated. In practice, establishing ranking criteria, which addressed statewide concerns in an equitable manner statewide, proved difficult to develop.

Cost Share Rates

Nationally, between 1997 and 2001 the average cost share rate was 36%. This ranged from 43% for management (incentive) payments, to 35% for structural practices. This accounted for almost $330 million in cost share, and $900 million in total cost. More detailed information by state is shown in Appendix Table A1-2.

Contract Issues

The prior program required contracts to be for a minimum length of five years and a maximum length of ten years. Most, but by no means all, producers opted for the five-year length. Anecdotal evidence suggests that this relatively long contract period deterred some producers from applying for cost share assistance. The potential for shrinking operating margins resulting from rising input costs and declining prices for product sales likely made many producers uncomfortable signing long-term contracts. This same phenomenon had been at least partially responsible for some of the cancelled contracts.

Current rules allow for only one contract per tract. This feature is easier to administer for USDA agencies (FSA). However, this also restricts the ability of producers and conservationists to address new problems that may arise resulting from changes in farm and ranch operation, environmental concerns, or extreme weather events.

The program does not allow payments for practices during the same fiscal year the contract is signed by a producer and approved by the Commodity Credit Corporation representative (FSA County Committee). This can result in a delay in receiving payment by producers who are able to quickly install conservation practices after an EQIP contract has been approved.

Contract Modifications

Modifications are allowed only due to agency error, omission, appeal, or in some instances, repair of storm damage to existing EQIP practices. There is no provision to increase program cost simply because costs have risen from the time plan estimates are made to when the practice is actually installed.

Proposed EQIP Rule and Action

This section applies both to the July, 2002 NOFA, and to the current proposed rule. There are few significant differences between the NOFA and the proposed rule, and those differences are investigated in the Discussion of Alternatives section at the end of this analysis.

Several changes brought about by the 2002 Farm Bill will potentially impact the EQIP Program. Some of the changes will profoundly impact producers; other changes will have subtle effects. Many of the changes deal with the internal administration of EQIP, and farmers and ranchers will notice little difference in terms of the type of assistance provided.

What farmers and ranchers may notice about administrative changes will be a smoother operation and application of the program. The rule changes offer the potential for far greater flexibility at the State and local level to implement the program in a manner that is tailored to local resource conditions and local producer conservation needs than offered by the previous iteration of the EQIP program.

Whether this potential increase in flexibility will be realized at the State and local level is an open question for which there is no clear answer. Under the prior program, the two major USDA agencies with roles in EQIP had to agree on major areas of program implementation. NRCS made decisions regarding the program with input from State and local conservation agencies, groups, and interested individuals through

the various State Technical Committees. Many of these decisions required the concurrence of the Farm Service Agency State Committee. The concurrence issues generally related to fund allocations within states and eligible practices and cost share rates. The joint participation in funding issues exerted a powerful and limiting influence on how the program is operated at the State and local level, in part due to some differences in missions and interests of the agencies.

The requirement for joint concurrence below the national level was eliminated in the NOFA EQIP. This will greatly streamline the program.

Funding

The previous program funding level was authorized at $200 million annually. The new Farm Bill authorized funding at a total of $5.8 billion from 2002 through 2007. This is nearly a five-fold increase in average annual funding. This major increase in funding will have the single greatest impact of any of the changes to the program. The greater availability of funds will enable States and counties to treat resource problems that require more expensive conservation treatments.

The increased funding should provide increased benefits to agricultural producers. Farmers and ranchers will be able to select the practices that best meet the resource conditions of their land, and best fit with their current operations, and may even assist them to transition to other sustainable enterprises such as organic agriculture.

The large increase in funding available may drive up the costs of installing conservation practices. Some geographic areas already have difficulty in obtaining the services of qualified contractors to install practices due to lack of numbers of these contractors. The increased levels of funding available for conservation will tend to increase the demand for these services and may have an impact on the fees charged by contractors for their services. However expansion of EQIP may in the longer term induce an increase of suitable contractors.

The increase in funding combined with the elimination of the priority areas will not have a significant reduction in program efficiency. The new funding is still small compared with the national need for conservation. An analysis in appendix 2 shows that, at least for erosion reduction, the average erosion reduction per acre achieved with the new program could increase compared with the older program.

Removal of "Buy Down" Procedures

The new Farm Bill eliminates the "buy down" procedures where operators could improve the offer index of their applications by reducing the amount of cost share funds they would expect. Removal of this provision eliminates a facet of the old program that producers found very confusing. This also eliminates an area of the program that tended to discriminate against smaller and limited resource producers, or those with less financial resources to cover their share of the costs. These producers may be less able to bid down their applications and as a result are at a competitive disadvantage. However, LRF's were more willing than large producers to buy down on labor-intensive practice costs. The removal of the "buy down" provisions will tend make the program more equitable for both large and small-scale farmers and ranchers, by increasing the Federal cost share for all. That increased Federal cost share makes the Federal funds in EQIP less cost effective than in the old program.

Payment Limitations

New rules will increase the contract payment limitation to $450,000 for all contracts held by a producer through 2007. This change may allow for more environmental concerns to be addressed on an individual contract. It may also remove a barrier to participation for large-scale producers who have previously felt that EQIP with the previous payment limits did not offer an attractive enough incentive for them to participate. This may increase the program availability and use to producers who control a large proportion of resources and potential resource needs.

Being able to reach large producers will tend to decrease the technical assistance and administrative costs per acre treated. Since there are certain "fixed costs" associated with developing contracts, large acreages on some contracts may decrease the proportion of program funds spent on technical assistance and administrative costs.

For a given funding level, larger contracts will tend to decrease the overall number of producers that are reached by the program, but this is expected to be more than offset by the very large increase in overall funding. Under the previous program, payments were limited to $10,000 annually. Exceeding this amount required the prior approval of the State Conservationist. The NOFA and proposed program eliminates this provision. This will have little impact on individual producers. Under the previous program, waivers were routinely granted provided the producer provided one of four justifications. Thus, this change will reduce program administration costs, and eliminate the burden for the producer to write a letter requesting a waiver.

Large Confined Livestock Operations

Removing the restrictions on offering assistance for animal waste facilities to CAFOs (defined as greater than 1000 animal units) will allow the program to reach this portion of the agricultural sector. The potential exists for increased water quality benefits as a result of this change. Although CAFOs were ineligible for structural animal waste practices, they were eligible for land treatment practices under the old program. Since the majority of water quality benefits are achieved through the proper utilization of nutrients on the land, and the benefit of storage structures is to facilitate the timely application of nutrients on cropland, the total water quality improvement from land treatment for large farm operators will be moderate.

By decreasing the costs incurred by large producers, hence, reducing overall production costs, there is a risk that this feature may cause an expansion in overall livestock numbers. This could potentially increase the supply and negatively impact prices paid to producers. In the later and larger years of the program, this could amount to a $1 billion annual subsidy to the $100 billion U.S. livestock industry. A study by the Food and Agricultural Policy Research Institute (FAPRI) projects that the conservation programs of the 2002 Farm Bill contribute $0.7 billion per year to farm income, compared to the commodity program provisions of the new Farm Bill increasing net farm income by an average of $3.8 billion per year.[11]

Competition for funds by large confined livestock operations may decrease the share of funding available for smaller livestock operations, but an overall increase in total EQIP funding available for smaller livestock operations.

Livestock Related Practices

The new law requires that 60 percent (50 percent is required under the previous program) of EQIP funds be allocated to livestock related practices. Since under the current program 62 percent of the contracted practices were livestock related, this should have very minimal effect.

Removal of Priority Area Requirement

Under the previous program, funds allocated to specially targeted priority areas are required to be at least 65 percent of the total funds available. The new program eliminates the requirement targeting funds to priority areas, which may result in a decrease of program funds being allocated towards targeted special areas as a result of this rule. The elimination of priority area designation in NOFA/Proposed Rule can be viewed both negatively and positively. One of the negative aspects, as discussed earlier, is that this process allowed for the concentration of EQIP funds into areas with the most pressing natural resource concerns. In addition, priority areas allowed local workgroups the ability to determine priority resource concerns and make all fund allocation decisions. As a result, this local control made priority areas very popular for those located within a priority area boundary. However, this is not the case for those located outside a priority area. The chance of participation for those located outside the boundary of a priority area was reduced. Nearly 41% of all applicants located within a priority area were accepted versus 24% located outside a priority area. Since only 1,400 priority areas were approved and funded nationwide over the five-year period 1997-2002, a large majority of applications were rejected.

[11] Farm Security and Rural Investment Act of 2002: Preliminary FAPRI Analysis
May 6, 2002, http://www.fapri.missouri.edu/Publications/FrmSecRI2002/FarmSecRI2002.pdf

As a result of this change, many producers who lived outside of priority areas may have an increased opportunity for participation in the program. This was a common element of frustration for those operators.

The elimination of priority areas may also tend to "water down" potential environmental benefits. Many environmentally-oriented individuals prefer a watershed/priority area approach because of the increased potential for environmental improvement on an ecologically more significant scale. The resulting environmental improvements will presumably be more scattered, and therefore will provide fewer "synergistic" enhancements.

Removal of this provision will provide States with the maximum flexibility to merge producer needs with resource concerns. In practice, some Local Work Groups have recognized that in addition to resource need, you also need to have a producer who is willing to participate in order to develop a contract and show resource improvement. Alternatives that still allow spatial targeting of funds are explored in Alternative 3 of this analysis.

Removal of the mandated funding for priority areas will allow the new program to better target funds toward resource concerns that are not geographically concentrated, such as erosion reduction. An analysis of soil erosion in Appendix 2 shows the potential for increasing the average erosion reduction per acre achieved because of the elimination of the mandated priority areas.

Contract Length

The new program allows for contracts that expire one year after the date of the installation of the last practice. Contracts could be as short as one year. This increased flexibility regarding contract length will be attractive to producers. Uncertainty regarding farm income prospects and ability to fulfill longer-term contracts may have discouraged some producers from signing contracts with a minimum length of five years under the old program. Shorter length contracts should remove one barrier to program participation of farmers and ranchers.

Multiple Contracts

Rules will now allow for more than one contract per tract. This will potentially allow producers to address more than one resource concern through multiple contracts. This will also allow the flexibility to address new resource concerns as they occur. Having multiple contracts allows the producer to prioritize and address the most significant concerns first, without the fear that the land will be tied up in a contract and ineligible for additional EQIP funded practices for a minimum of five years.

Multiple smaller contracts also decrease the risk to producers. This reduces the likelihood of contract cancellation. If a contract is still cancelled, the impacts are less since fewer contract practices are involved.

The use of multiple contracts per tract will tend to increase administrative costs. Multiple contracts will also further promote the use of progressive planning and move away from Resource Management System (RMS) planning. It could be expected that there were be less overall benefits per contract because each contract is not expected to reach an RMS level.

Contract Payment Changes

Under previous rules, a producer could not receive payments for practices that were installed during the same fiscal year the contract was approved. The next fiscal year, payments could be made immediately upon practice completion and certification. The new rule eliminates this provision and producers may receive payments for practice completion, regardless of fiscal year.

This change may result in more expensive practices being installed sooner, with the treatment of more critical resources more efficiently. Historically, however, the timing of fund allocations to the states has occurred in late winter. This delayed the approval of contracts until early spring at the earliest, so that the effective delay in payment was never more than six months at the most. The overall effect of this rule change should be negligible.

Application Evaluation

The new law eliminates the requirement to "maximize net environmental benefits per dollar expended." Contracts were evaluated and ranked based on cost share dollars divided by an environmental score. The NOFA and proposed programs prohibit a formula that includes the cost share dollars as the old program's "offer index" did. Cost is indirectly considered though guidance that states a higher priority should be assigned to encourage cost effective conservation practices. This change should allow individual states the opportunity to develop methods for evaluating contracts that optimize benefits. Overall, this change may decrease the EQIP program benefit-cost ratio because cost is prevented from being directly considered in the evaluation process.

Contract Modifications

Contract modifications will have much greater flexibility. Under the old program, contracts could not be modified if the modification would have altered the offer index so that the contract would not have been originally selected. In addition, under the old program, cost increases for individual components were considered inflation, and were not eligible. Practices installed during the final years of a five to ten year contract might experience cost increases that could not be compensated through the program. The new program eliminates these constraints, which should increase participant satisfaction with the program.

The changes may also reduce cost control and increase program costs. The potential negative impacts on cost control and program costs are effectively offset by use of individual practice payment limitations, which will be required. Further, shorter contract lengths will tend to lessen the need for contract modifications due to price increases over time.

Impact of Third Party Technical Service Providers

The 1996 Farm Bill language authorizes the use of external providers for technical assistance. The providers could be non-Governmental partner organizations or private entities. NRCS is currently in the process of drafting rules and policy for governing the agency's use of the service providers. Transaction costs for implementing a third party vendor policy have not yet been quantified.

It is expected that these providers will eventually significantly impact implementation of the Farm Bill, especially the EQIP. The significant workload tied to the major increases in funding levels NRCS will continue to be responsible for eligibility determinations and contract administration costs, however, external technical service providers will be able to perform all activities relating to planning and implementation of conservation practices.

NRCS will incur additional training costs, and will experience some increase in administrative costs. This will include time spent in the process of certifying third party providers and providing quality assurance. It will also include costs associated with the development of progress reporting mechanisms for external technical assistance providers. How these costs compare with any anticipated savings resulting from lower technical assistance costs has not been determined.

Technical service providers will have to provide their services at rates that are less than or equal to NRCS costs for the same activity. The actual amount of provider costs is unknown. Private costs to these entities will be the standard costs associated with carrying out a business. They will include but are not limited to costs of becoming certified and trained, acquiring and maintaining equipment, if necessary, and costs of liability and other insurance. External providers will also factor in a reasonable profit margin.

The availability of third party providers and the services they will provide will be influenced regionally. Individual NRCS State Conservationists have the flexibility to administer the policy within their respective States. The market will also determine the types of practices to which external providers are expected to gravitate. This will be influenced by program needs.

Limited Resource Farmers and Beginning Farmers

Under the old EQIP rule, all cost sharing was limited to 75 percent nationally. The new rule allows States the flexibility to cost share up to 90 percent for those defined as **limited resource farmers** or **beginning farmers**. The Department has undertaken an activity to provide a definition of limited resource producer and beginning farmer and rancher to be used uniformly within the Department. The term "Limited

Resource Farmer" is used for at least five USDA programs; while "Beginning Farmer" is used in several additional programs. These EQIP proposed rules are the first public publication of these common Department definitions. The Limited Resource Farmer definition will be used for three additional USDA programs, but not for the FSA loan program. Comments on this section are encouraged.

Beginning Farmer/Rancher: an individual or entity who:
(a) Has not operated a farm or ranch, or who has operated a farm or ranch for not more than consecutive 10 years. This requirement applies to all members of an entity, and
(b) Will materially and substantially participate in the operation of the farm or ranch.
(1) In the case of an EQIP contract with an individual, individually or with the immediate family, material and substantial participation requires that the individual provide substantial day-to-day labor and management of the farm or ranch, consistent with the practices in the county or State where the farm is located
(2) In the case of a contract made to an entity, all members must materially and substantially participate in the operation of the farm or ranch. Material and substantial participation requires that the members provide some amount of the management, or labor and management necessary for day-to-day activities, such that if the members did not provide these inputs, operation of the farm or ranch would be seriously impaired.

In the 1997 Agricultural Census, there were 482, 997 farm operators with less than ten years on the present farm, 30% of all farm operators. They tend to have smaller farms, concentrating more into minor crops and livestock than grain and soybeans. Only 34% of these consider farming as their principle occupation, compared with 57% percent of farmers with over ten years on the farm. Most beginning farmers also work a full-time job besides managing the farm. They are less likely to currently be obtaining any Government payments. Higher proportions of Hispanic and female operators will qualify as beginning farmers.

Beginning farmers and ranchers have a problem of low cash reserves and low equity positions that prevent their expenditures on conservation practices. Many have the education and technology available to practice good conservation, but their current loan payments are so large that they do not have the available cash. Because of their ages, they are more likely to have dependant children and higher household expenses. Providing qualified beginning farmers and ranchers with the higher cost-share should help to promote good conservation by these producers.

The 'all members of the entity' subsection (2) disallows younger farmers being brought up within well-establish extended family farms, whether in partnerships or family corporations. This is consistent with long-term 'beginning farmer' program rules in other USDA programs. It is likely that the extended family farms have enough resources to meet their necessary cost share for these conservation practices. These multi-generation family farms also tend to already provide better conservation on their lands because of their extended planning horizon.

Limited Resource Farmer :
(a) An individual, directly or indirectly, with gross farm sales not more than $100,000, and
(b) Has a total household income at or below poverty level for a family of four, or less than 50% of county median household income, in each of the previous two years.

Limited Resource Farmers tend to concentrate with beef cattle and non-grain field crops like tobacco, cotton, peanuts, and hay. An earlier definition of "Total operator household income is under $20,000; total farm assets are under $150,000; and gross sales are under $100,000" has been used by ERS and in USDA policy documents during Congressional development of the Farm Bill. Estimated numbers using the ERS definition consist of 7.8% of all farms, with only 0.8% of total sales, but control 1.2% of farmland, often the poorer farmland with greater per-acre conservation needs.[12]

Economic Research Service. 2001. Structural and Financial Characteristics of U.S. Farms, 2001 Family Farm Report, Ag. Info. Bull. #768, http://www.ers.usda.gov/publications/aib768/

This current proposed definition was created to make it more usable in the field offices. This definition is also being considered for the Risk Management Agency and FSA Non-Insured Crop Disaster Assistance Program (NAP). It allows easier certification and verification with personal and farm income tax records, the same verification forms already needed for the $2,500,000 Income Limitation rules. Higher percentages of Black, Native American and female farm operators will quality as Limited Resource Farmers.

Applicants would have to have a household income at or below a qualifying level, which in turn would be based on the higher of two thresholds The qualifying household income level would be the greater of (1) the national poverty level income, as defined by the Census Bureau for a household of 4 persons, or (2) 50 percent of the estimated county median household income for the most recent year as reported by the Census Bureau. Each of those measures is indexed to overall inflation; the poverty threshold is adjusted each year by the Commerce Department and the county median moves with inflation. Each base is also easily available.

Using a dual household income threshold assures that households with incomes below the poverty line remain eligible for limited resource status, while also extending the status to relatively poor households in higher income counties, where higher costs of living may limit the financial resources available to those households for farming. Use of the county median measure alone could exclude some deserving households in very poor counties.

The level would be determined annually for each county based on two objective factors, as discussed above. The level would be the greater of the poverty level for a household of 4 and 50% of the median county income level.

A limited resource farmer would be limited to gross farm sales less than $100,000, (increased, beginning in fiscal year 2004, by the inflation percentage applicable to the fiscal year in which a benefit is being requested.)

The inflation percentage applicable to a fiscal year is the percentage (if any) by which –

(1) The average of the Prices Paid by Farmers Index (as compiled by NASS) for the 12-month period ending on August 31 of the immediately preceding fiscal year; exceeds

(2) The average of such index (as so defined) for the 12-month period ending on August 31, 1996.

This inflation index (and procedure) is currently a statutory requirement for the FSA farm loan programs, used to set annual loan limits for their guaranteed loan programs. Therefore, the inflation percentage is already being collected by USDA and is readily available.

The definition is designed to account for strong regional variations in income, ensure that neediest farmers and ranchers are not excluded, and screen out wealthier farmers and ranchers with temporarily realized income or cash flow. The definition describes those producers with low income and sales and takes into account regional variations in both type and scale of operation.

The requirement of meeting this income limit in both preceding years is used in order to weed out those producers who might qualify as LRF by moving sales and income form one year to another, but who are not needy, and to ensure that a single anomalous year does not affect the determination of whether a producer is a limited resource farmer or rancher. This is based on the existing RMA definition. An alternative that would accomplish the same purpose for USDA would be to use the same three-year average as the proposed Income Limitation rule. For EQIP applicants, this three-year average is already calculated during the $2,500,000 income limitation certification process.

USDA would create a simple tool on its web site, whereby the user (i.e. producer, insurance agent, USDA Service Center employee, etc.) would simply click on a state and county, and then be able to print out a "self certification" form with the appropriate sales and income levels for that county.

The definition has the great advantages of clarity and brevity. It would not have to be amended on a regular basis. The data needed each year are readily available from the Census Bureau, National Agricultural Statistics Service, and applicants' own tax forms.

The only national/regional dataset that can be used to estimate the number of farmers within this definition for a given year is the Agricultural Resource Management Survey (ARMS). The ARMS survey is an annual survey, conducted with different farms each year. There is no panel data available that can estimate data for the same farm over different years. Thus USDA has no estimate of how many farmers are excluded by the phase **"in each of the previous two years."** The Limited Resource Farm table below has estimates of the number of Limited Resource Farms using this definition, but only base on the year 2000.

This change increases the appeal to producers with limited means to install conservation practices, however since this group also has limited access to capital, it may increase the chance that contracts may be cancelled. This group of producers is inherently more at risk because of the relatively constrained financial resources available to them. Contract size, dollars obligated per contract, and practices installed will tend to be smaller, impacting the overall technical and administrative efficiencies of the program. There may also be a need for more specialized needs for staff to overcome language or cultural barriers.

The risks to the overall program costs are small since even if the number of Limited Resource applicants increases over 10% (unlikely), the average size of their contracts will minimize the overall impact on EQIP. Most Limited Resource farmers qualifying as a Beginning Farmer or Limited Resource Farmer has a greater significant effect on the farmer than on the federal costs. Qualifying as a Beginning Farmer or Limited Resource Farmers could reduce the farmer's costs of participating in the EQIP program by 60%; but would only increase USDA's costs by 15%. See the example below, which assumes a potential $10,000 EQIP.

Contact Cost	$10,000
Federal TA Costs	$ 2,800
Total EQIP Cost	$12,800

	With Normal 75% C/S	With 90% C/S	Savings	**% Savings**
Farmer Costs	$ 2,500	$ 1,000	$1,500	**60.0%**
NRCS Costs	$10,300	$11,800	-$1,500	**14.6%**
Total Costs	$12,800	$12,800	$0	

Limited Resource Farms and other Farm Typology Groupings

Defined as Gross Sales Less Than $100,000 and Poverty Level Income or Household < 50% County Median
for a single year, by farm typology grouping, 2000

Item	48-State total	Farm typology grouping						
		Limited-resources (2000 only)	Retirement	Residential /lifestyle	Farming occupation /lower-sales	Farming occupation /higher-sales	Large	Very large
Acres operated	896,026,489	91,077,254	40,274,836	144,724,031	145,337,011	181,460,605	132,762,450	*160,390,303
Average Acreage operated	422	254	148	167	457	1,056	1,694	*2,922
Number of farms	2,121,489	359,228	271,375	867,772	318,021	171,824	78,382	54,886
Percent of farms	100	16.9	12.8	40.9	15	8.1	3.7	2.6
Cash Grains and Soybean	15.3	12.1	5.3	10.4	20.9	39.5	38.9	20.6
Other Field Crops	19.1	16.8	32.1	20.4	14.7	11.2	10.5	10.8
High Value Crops	7	7.2	*10.2	4.4	8.8	8.9	7.2	13.5
Beef Cattle	37.7	42.7	37.4	42.7	40.4	16.6	13.3	12.5
Hogs, Poultry and Dairy	6.1	4.9	na	*1.6	5.4	20.9	26.7	40.3
General Livestock	14.8	16.3	14.2	20.4	9.8	3	3.4	2.3
Northeast	7	10.1	na	6.6	5.2	7.9	7.2	5.3
Lake States	9.7	10.3	na	9.2	9.1	15.3	12.5	10.4
Corn Belt	19.8	17.4	17.3	19.2	20.7	27.2	27.3	17.8
Northern Plains	8.3	6	na	6.4	11.7	17	17.5	12.3
Appalachia	14.3	14	22.7	15.7	10.9	6.8	6.7	7.1
Southeast	7.7	8	9.3	8.3	6.8	4.9	3.3	7.6
Delta	5.6	7.9	na	5.9	3.6	4.1	5.8	8.4
Southern Plains	14.5	16	16.6	16.2	14.3	5.3	5.8	7
Mountain	5.9	*4.4	*4.5	6.3	6.4	6.6	6.7	7.8
Pacific	7.3	5.8	*8.8	6.1	11.2	4.8	7.1	16.4
Average Value of Farm Assets	509,505	368,825	356,983	324,136	549,929	823,207	1,248,424	2,843,577
Average household income	62,220	5,061	49,777	82,629	66,793	44,987	81,219	175,489

Source: 2000 USDA Agricultural Resource Management Survey, calculations by ERS, 10/2002.
Based on 9,863 observations. All 48 contiguous States were included in the sample. *items has low statistical reliability.

Methods of Cost Share

Four methods are available for establishing cost share rates for conservation practices, and all contain some type of maximum limit. As discussed briefly under the Contract Modifications section, the methods available will tend to reduce program cost inflation due to price increases charged by contractors.

Relationship of EQIP to Other Farm Bill Conservation Programs

Conservation Reserve Program (CRP)/Conservation Reserve Enhancement Program (CREP)

The CRP and CREP are land idling programs, designed to idle existing cropland for varying amounts of time. The intent of the programs is to retire marginally productive lands that also contribute significant amounts of pollutants to surface waters or provide significant wildlife benefits, or both.

The impact of these programs is to reduce the amount of low productivity land used to produce crops in the United States, provide a source of steady reliable income to owners of the enrolled cropland, reduce agricultural non-point source pollution, and provide habitat for wildlife species.

Land enrolled in CRP/CREP is eligible for EQIP provided the practices contracted through EQIP are applied after the CRP/CREP contract expires. There is very little CRP acreage with EQIP contracts on them and this is not expected to change with the implementation of the new Farm Bill.

Wetlands Reserve Program (WRP)

This program offers incentives to landowners to enhance and restore wetlands in exchange for retiring land from agricultural production. A limited amount of adjacent land can be included as a buffer. Land enrolled in WRP is eligible for EQIP to install conservation practices if the WRP cannot address the resource concern.

The program offers landowners three options including a permanent easement, a 30-year easement, and a restoration cost share agreement only. The financial assistance offered to landowners varies with each of the options. A permanent easement offers 100 percent of the value of an easement (development rights are not included in the valuation of the easements) and 100 percent of the restoration costs. A 30-year easement offers 75 percent of the value of the same easement along with 75 percent of the restoration costs. A cost share agreement only provides 75 percent of the costs of restoration. There is no easement involved with this option; however, the cost share agreement is normally for a period of ten years.

Impacts of the program include an immediate payment to the successfully enrolled landowner, a reduction in the production of agricultural commodities, and improved wildlife habitat, especially for those species specifically associated with wetland environments.

The WRP is a land idling program. Since WRP converts existing land uses to primarily wetlands, there is little need for an EQIP contract on these lands.

Wildlife Habitat Incentives Program (WHIP)

The purpose of the WHIP program is to create high quality wildlife habitats. Special priority is given to projects that support wildlife species of Federal, State, local, or tribal importance.

All types of land are eligible; however, this program is not primarily a land idling program, since very little cropland is directly impacted by WHIP projects.

The major impact of the program is the creation of habitat for species of importance in each State. The majority of projects have been involved with improving upland wildlife habitats. It is not expected that EQIP funds will be used in addition to WHIP funds on the same acreage.

Farmland Protection Program (FPP)

The intent of the Farmland Protection Program is to help farmers keep their land in agricultural production. The program achieves this aim by purchasing conservation easements that essentially buy up development rights from the

landowners. The landowners also agree to implement a conservation plan for any highly erodible land contained in the easement area. EQIP could potentially be used by landowners to help address specific practice needs.

Eligible lands are currently part of a farm or ranch that is large enough to be a viable agricultural enterprise, include prime, unique, or other productive soil, and be under threat of development for non-agricultural uses.

This program not only retains farmland in agricultural uses, but also maintains green space in areas subject to development pressures.

Conservation Security Program (CSP)

This is a new program to be unveiled during fiscal year 2003. The program is intended to reward landowners for their efforts on behalf of land stewardship. Payments are made to holders of agricultural lands at varying levels depending on the level of conservation applied to the land. There are three levels of payment offered. The first tier treats at least one resource concern to the Quality Criteria level contained in the NRCS Field Office Technical Guide (contracts are for five years). Tier two is the same as tier one, but covers the entire agricultural operation with contracts of between five and ten years. Tier three contracts are for five to ten years and treat all of the resource concerns to a Resource Management System (RMS) level on the entire agricultural operation. The Conservation Security Program also makes technical and financial assistance available to help producers reach and maintain these high levels of conservation. This technical and financial assistance is similar to the EQIP cost sharing, using the same 75% maximum cost share limits. Efforts will be made to assure that the EQIP and CSP cost share rates will complement each other.

EQIP will be used by some producers to enable them to move to greater levels of resource protection, and allow the producers to receive greater payments under the CSP program. In both Federal program implementation and on-farm assistance, the current EQIP rules are setting standards that will probably be adopted by the later CSP program. The expectation of obtaining longer-term payments for maintaining conservation practices may increase the number of EQIP applications through the life of this Farm Bill. The interaction of these two programs will benefit each and succeed in obtaining more conservation on the ground.

The Office of Management and Budget has an annual responsibility to provide a report to Congress of the total costs and benefits of all regulations[13]. In this case, USDA will avoid any double counting of benefits between the CSP program and the EQIP program. Since the rules of CSP are still being written, this EQIP Cost/Benefit analysis is not considering any impacts of the Conservation Security Program in this analysis. In particular, the environmental and economic benefits of EQIP are based on the longer of either the particular conservation practice life or 10 years. This proposed EQIP rule states, “The participant shall operate and maintain the conservation practice for its intended purpose for the life span of the conservation practice(s) installed with the program, as determined by CCC.”

The CSP Cost/Benefit analysis will be written after and in relation to this EQIP Cost/Benefit analysis. That analysis will use a similar approach to this EQIP analysis for those practices installed with CSP funded technical or financial assistance. It will take credit for environmental and economic benefits from continuing conservation practices over a longer term. In particular, if the practices are installed with EQIP funds, benefits from these particular EQIP funded practices will not occur in the CSP analysis unless payments on operations and maintenance (O&M) expenses effectively extend the benefits counted in this document.

Grassland Reserve Program (GRP)

This is a new program authorized under the Farm Bill. The agency that will be responsible for administering the program has not been determined yet; so, final rules have not been determined. The information provided here on this program should be considered preliminary and subject to change. The information is current and is the best available at this time.

The Grassland Reserve Program is targeted toward protecting grassland and shrub land under threat of conversion to other uses. Landowners may enroll in permanent or 30-year (or the maximum allowed under state law if different) easements, or the landowner may enroll in a rental agreement for 10, 15, 20, or 30 years. With a permanent easement, the landowner is offered the appraised value of the land, less the grazing value. Thirty-year easements, or the maximum allowed under State law receive 30 percent of the appraised value. The rental agreements receive up to 75 percent of the grazing value in an annual payment for the length of the contract.

[13] OFFICE OF MANAGEMENT AND BUDGET, Draft Report to Congress on the Costs and Benefits of Federal Regulations, 15014, Federal Register / Vol. 67, No. 60 / Thursday, March 28, 2002

The program does provide for the installation of conservation practices as needed; however, the available funding is such that other programs may be looked to in order to fulfill any needs for additional conservation practices.

Eligible lands may be in any current land use, if the land was historically grassland, and capable of being restored to a grassland use. Grasslands may be grazed when enrolled in the program. As such, this is not primarily a land-idling program.

While the Grassland Reserve Program can fund any needed conservation practices under its existing authority, the funding for the program may be somewhat limited. The easements to maintain lands in a grassland use may be relatively costly, and use the bulk of the funds available to the program. EQIP could provide assistance with installing any needed conservation practices and in this way help the Grassland Reserve Program achieve its goals.

Forest Lands Enhancement Program (FLEP)

The U.S. Forest Service will administer FLEP. Landholders of private, non-industrial forestlands are eligible to use FLEP to assist them in enhancing timber production in a sustainable manner and provide additional residual benefits to water quality and wildlife.

Primary practices included in the program are expected to be tree planting, site preparation, timber stand improvement, as well as forest riparian buffers and other practices suitable for providing resource benefits and improving overall forest health and resource management. Eligible practices may receive up to 75 percent cost share.

In order to receive cost sharing the landowner must have a forest management plan developed which is also eligible cost share. The plan must at a minimum address the site enrolled in the program, but may treat additional acreage on the tract as well.

It is expected that EQIP (the 2002 Farm Bill also allows EQIP to address private non-industrial forest lands) will have little or no overlap with the FLEP program. Most of the landholders with primarily forested tracts will tend to enroll in FLEP. Farmers and ranchers with a portion of their lands in forested uses will be more likely to enroll in EQIP.

Some of the conservation programs contained in the new Farm Bill are essentially land-idling programs. Included in this category are CRP/CREP, WRP, and to a lesser extent, WHIP. FPP, FLEP, and CSP along with EQIP are oriented towards working agricultural lands.

It is expected that for the most part, EQIP will have little or no overlap with most of the other conservation programs contained in the Farm Bill. Exceptions for most programs will be rather limited. EQIP probably will probably have significant indirect interaction with the Conservation Security Program. EQIP will also likely assist producers who enroll in the Grassland Reserve Program address their conservation needs, and in some individual cases possibly with the Farmland Protection Program.

Expected Macro Economic and Structural Impacts

CAFO versus. EPA Regulations

The Environmental Protection Agency published proposed revisions to the National Pollutant Discharge Elimination System Permit Regulations and the Effluent Guidelines and Standards for Concentrated Animal Feeding Operations.[14] Under a consent decree, EPA must take final action on these regulations no later than December 15, 2002.

The existing regulation defines facilities with 1,000 animal units (AU) or more as CAFOs. The regulation also states that facilities with 300 -1000 AU are CAFOs if they meet certain conditions.[15] With this in mind, the original EQIP regulations did not allow cost sharing on CAFOs greater than 1,000 AU since the animal waste from these facilities would be covered by the EPA regulations. Therefore, EQIP cost sharing would have little additional environmental benefits.

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[14] ENVIRONMENTAL PROTECTION AGENCY, 40 CFR Parts 122 and 412, [FRL-], RIN, National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, the Federal Register on January 12, 2001, at 66 FR 2959.(http://cfpub1.epa.gov/npdes/afo/preamble.cfm?program_id=7)

[15] The term AU is a measurement established in the 1970 regulations that attempted to equalize the characteristics of the wastes among different animal types; there are significant differences between the legally defined EPA definition and the USDA definition. The analysis underlying this report translates between the two definitions as needed.

Today's proposals present two alternatives for how to structure the revised NPDES program for CAFOs. The first alternative is a "two-tier structure" that simplifies the definition of CAFOs by establishing a single threshold for each animal sector. This alternative would establish a single threshold at the equivalent of 500 AU above that operations would be defined as CAFOs and below which facilities would become CAFOs only if designated by the permit authority.

The second proposal would retain the "three-tier structure" of the existing regulation. Under this alternative, all operations with 1,000 AU or more would be defined as CAFOs; those with 300 AU to 1,000 AU would be CAFOs only if they meet certain conditions or if designated by the permit authority; and those with fewer than 300 AU would only be CAFOs if designated by the permit authority. These conditions are detailed in section VII of this preamble and differ from those in the current rule. Facilities with 300 AU to 1,000 AU would certify that they do not meet the conditions for being defined as a CAFO or apply for a permit.

This new EQIP stature was specifically changed to allow cost sharing of large CAFOs to help them meet regulations. **''SEC. 1240. PURPOSES.**" states:

"The purposes of the environmental quality incentives program established by this chapter are to promote agricultural production and environmental quality as compatible goals, and to optimize environmental benefits, by—

''(1) assisting producers in complying with local, State, and national regulatory requirements ...
''(2) avoiding, to the maximum extent practicable, the need for resource and regulatory programs ...
''(3) providing flexible assistance to producers to install and maintain conservation practices that enhance soil, water, related natural resources (including grazing land and wetland), and wildlife while sustaining production of food and fiber;
''(4) assisting producers to make beneficial, cost effective changes to cropping systems, ...
''(5) consolidating and streamlining conservation planning and regulatory compliance processes to reduce administrative burdens on producers and the cost of achieving environmental goals.

The economic analysis shown here is based on the economic and environmental impacts of the conservation practices installed with the financial assistance and technical assistance provided by the EQIP program funds. The base analysis does not discriminate between these measures being installed on a totally voluntary basis, those being install to avoid the need for new regulations, and those assisting producers in complying with regulatory requirements. The statute was amended purposely to avoid that discrimination. The increased livestock percentage of program costs, and the increased cost limitation was added precisely to help large livestock producers comply with these EPA regulations.

The Office of Management and Budget has an annual responsibility to provide Congress a "Report to Congress on the Costs and Benefits of Federal Regulations"[16] totaling the costs and benefits of all regulations. That is the one point where adding the costs and benefits of the EPA regulations on CAFOs and the costs and benefits of EQIP spending to assist producers in complying with the EPA regulations could result of double-counting of both costs and benefits. At that point, OMB should deduct both the costs and benefits from this analysis for those particular size CAFOs from this rules. The spreadsheets underlying this analysis were designed to permit that adjustment. The environmental benefits should be counted once in the total, but perhaps assigned to both programs. The EQIP financial and technical assistance costs for helping the producers comply with regulations would simply become transfer payments from the federal government to the private sector.

EQIP impacts on industry structure

Currently US Agriculture averages about $200 billion in cash receipts, about half in crop sales and half from livestock. Total EQIP funding will be below 1% of cash receipts for the industry and is not expect to have a measurable impact on the agricultural industry structure. The national distribution of funds and the elimination of the priority area requirements will minimize industrial changes.

The proposed EPA CAFO regulations will have measurable impacts on the confined livestock industry. The largest EQIP expenditures will be assisting a proportion of producers in complying with these regulations. But the EQIP program itself will be too decentralized by sector and region to cause any measurable industrial sector changes.

[16]OFFICE OF MANAGEMENT AND BUDGET, Draft Report to Congress on the Costs and Benefits of Federal Regulations, 15014, Federal Register / Vol. 67, No. 60 / Thursday, March 28, 2002

Farm Income Statistics[17]

($ Billion)

Year	1998	1999	2000	2001	2002F	1992 – 2001 avg.
Cash income statement						
Cash Receipts	196.0	187.5	193.7	202.8	195.8	190.6
Crops	101.9	91.9	94.1	96.4	98.8	96.9
Livestock	94.1	95.6	99.6	106.4	97.0	93.7
Direct Government payments	12.4	21.5	22.9	20.7	16.2	13.0
Farm-related income	13.9	15.0	13.8	14.9	15.1	11.7
Gross cash income	222.3	224	230.4	238.5	227.1	215.3
Cash expenses	165.5	166.9	172.0	178.8	178.1	158.6
Net cash income	56.8	57.1	58.4	59.7	49.0	56.8
Farm income Statement						
Gross cash income	222.3	224.0	230.4	238.5	227.1	215.3
Noncash income	10.3	10.7	11.2	11.2	11.3	10.0
Value of inventory adjustment	-0.6	-0.3	0.1	-3.2	-2.7	0
Gross farm income	232.1	234.5	241.7	246.5	235.7	226.1
Total production expenses	186.5	188.3	193.7	200.8	200.4	179.2
Net farm income	45.6	46.2	48.0	45.7	35.2	46.9

Need for EQIP Program (No Action Alternative)

The no action alternative to implement EQIP is not a viable alternative because the legislation requires the Secretary to promulgate a regulation.

Without the EQIP program being carried out, agricultural producers and land users would not receive any Federal financial assistance, technical assistance availability would be severely reduced, and it would increase the burden of providing additional assistance to the State and local level. Without the necessary Federal financial and technical assistance that EQIP provides, the planning and implementation of critical conservation systems that provide environmental benefits for all citizens would be severely reduced. The significant reduction in planning and implementation of critical conservation systems could have a negative impact on the environment and cumulative non-point source pollution would most likely increase.

Finally, the No Action Alternative goes against the wishes of Congress. Therefore this alternative is eliminated from further analysis.

Description of Analysis

This analysis was conducted through a tiered approach. The first benchmark was assumed to be the EQIP program as defined by rules and regulations developed for the 1996 FAIRA. This assumed that the old EQIP program would continue for the next farm bill cycle under constant funding levels of $200 million per year.

The proposed EQIP program rules are then compared to the old program in order to determine the effects of the proposed changes.

Finally, four alternatives to the proposed program rules were analyzed and compared to the proposed program. These four alternatives illustrate the major program changes that could have the most profound effects on overall program benefits and costs.

Baseline of Current EQIP

The baseline condition assumes that the EQIP program continued under the old rules and funding levels for the next six years. The following matrix highlights the changes between the old and new programs.

[17] Economic Research Service, USDA Agricultural Outlook/September 2002, Table 30- Farm Income Statistic, http://www.ers.usda.gov/publications/agoutlook/sep2002/ao294j.pdf

Comparison Between Old EQIP Program and NOFA/Proposed EQIP Program

Old Program Rules	Proposed Changes	Effects
Program Funding $200 million per year.	**Program Funding** $5.8 Billion from Fiscal Year 2002 through 2007	+ $3.4 B FA increase + $1.2 B TA increase + Treat additional acres: • .9 million acres for USLE reduction • 2.3 million acres for wind erosion • 8.5 M acres for non-waste nutrient management • 9.6 million acres for net irrigation water reduction • 3.1 million acres for grazing productivity • 4.1 million acres for wildlife habitat + Treat an additional 4.8 million Animal Units, and 2,755 Animal Feeding Operations + Total sedimentation decreased by 7.5 million tons/year. + The rate of natural resource (Soil, Water, Air, Plants, Animals + Human or SWAPAH considerations) degradation will be decreased. + Total benefits (monetary and environmental) will be increased. – Total costs (monetary) of the program will be increased. – Applicants may be less willing to minimize overall costs due to the abundance of available cost-share funds. – The additional funds may cause installation price increases of conservation practice costs.
Improving Offer Index "Bid Down" 7CFR Sec. 1466.20 (e) The designated conservationist will work with the applicant to collect the information necessary to evaluate the application using the ranking criteria. A participant has the option of offering and accepting less than the maximum program payments allowed. 515.85 (b) The producer may improve his/her offer index by: Providing additional environmental benefits without increasing the program cost Accepting a rate less than the established program cost-share rate Accepting an incentive payment lesser than the established limit.	**Improving Offer Index "Bid Down"** Eliminated. Eliminated.	+ Removes bias against Limited Resource Farmers (LRF) or small producers who could not afford a lesser cost-share. – This will create the potential for a larger percent of conservation costs to be borne by the program, effectively decreasing the benefits per dollar spent. Average cost-share levels ranged from 33% for practices linked to reducing erosion to 63% for livestock-related practices. Cost-share rates were adopted to target environmental concerns (see Alternative 3d) – LRF's were more willing than large producers to buy down on labor-intensive practice costs. This effectively eliminates this option. – If the buydown provision were still in effect with the new funding levels, 141 million additional acres of land could be treated
Maximum Payment Limitation 7 CFR 1466.23 (b) Total amount of cost-share and incentive payments paid to a person may not exceed: $10,000 per person per FY or $50,000 per person per contract Reference 515.102 (a) in the manual.	**Maximum Payment Limitation** 7 CFR Sec. 1466.23 (b) Total amount of cost-share and incentive payments paid to an individual or entity may not exceed: An aggregate of $450,000 directly or indirectly for all contracts entered into during fiscal years 2002 through 2007 provided Starting in fiscal year 2003, the average adjusted gross income of the individual or entity for the previous three years does not exceed $2.5 million. Reference 515.102(b) in the manual.	+ Potentially, additional resource concerns may be addressed per applicant. + May increase the likelihood of participation by removing the payment limitation barrier of larger producers. This potentially increases the utility of the program to reach a segment of producers that control a large amount of the natural resources and critical problem areas. + More effective usage of NRCS technical and administrative personnel due to the fixed costs of TA per contract. o May proportionally decrease the number

Old Program Rules	Proposed Changes	Effects
		of producers receiving projects (however, the total number of producers will increase due to the overall increase in funding). – By decreasing the portion of costs incurred by the producer (effectively decreasing overall production costs) there is a potential chance of expanding livestock numbers. The indirect effect could be an increase in supply corresponding with a decrease in price.
Large Confined Feeding Operations (CAFO) 7 CFR 1466.7 (b)(1) CCC cannot provide cost-share assistance to construct an animal waste management facility on a large confined livestock operation. CCC may fund other structural, vegetative, or land management practices needed in the Conservation Management System to address the livestock-related natural resource concerns on a large confined livestock Except as provided by paragraph (b)(2) of this section, CCC will consider a producer with confined livestock operations of more than 1,000 AU equivalents to be a large confined livestock operation and ineligible for financial assistance for construction of an animal waste management facility. When determining the number of livestock in the participant's operation for eligibility purposes, the total number of animal units confined at all location of the participants operation will be used. (2) The NRCS State Conservationist may develop a definition for a large confined livestock operation as it applies to that particular state using criteria recommended by the State Technical Committee. ▪ Reference 515.96 (a) in manual. ▪ Reference 515.96(d) in manual.	**Large Confined Feeding Operations (CAFO)** ▪ Deleted	+ Total Water Quality benefits increased due to the probability that the larger CAFOs will be treated. + Increases the likelihood that contracts will be completed. o No discernable change in Land Treatment practices since they were already eligible. o Will provide assistance to between 549 and 5,249 (table bc23) Large Farm Operations (LFOs) to comply with existing environmental regulations but would replace funds being used to create new environmental benefits since these regulations already require LFOs to comply. – May increase farm size due removal of the 1,000 animal unit barrier.
Funding Allocation ▪ 7CFR 1466.23 (a)(1) Consistent with the maximizing the overall environmental benefits per dollar expended by the program, NRCS may: o Designate a watershed, an area, or a region of special environmental sensitivity or having significant soil, water or related natural resource concern as a priority area and give special consideration to applicants who have conservation plans that address the natural resource concern(s) for which the priority area was designated. o 515.70 (d) Designated priority areas will receive the majority of available funds.	**Funding Allocation** ▪ 515.71 (a) The State Conservationist with advice of the State Technical Committee will determine how to focus EQIP funding. The State Conservationist will direct funds to identified priority resource concerns at the state and/or local level.	+ States will be given maximum local control on funding decisions. + States can better target funds to apply conservation on the worst resource problems, within and without of the priority areas. – Percent of program funds allocated to targeted geographic areas may decrease. – The potential for measurable environmental impacts could decrease because there may be less targeting in specific geographic areas.
Payment Limitation Waivers ▪ 7CFR 1466.23 (3)(i) The NRCS State Conservationist may authorize, on a case-by-case basis, payments in excess of $10,000 in any fiscal year, up to the $50,000 limitation. However, such increases in payments for a certain year shall be offset by reduction in payments in subsequent years.	Payment Limitation Waivers ▪ Deleted	+ Administrative burden of tracking limitation waiver requests eliminated. o Overall this should have little to no effect due to the waiver procedures historically implemented by states.

Old Program Rules	Proposed Changes	Effects
▪ 515.103 (a) NOTE: In no instance would a person receive more than $50,000 in any 5-year period.		
Purpose of Program ▪ 515.13 (a) The EQIP objectives are to provide: – Flexible technical assistance to producers that face the most serious threats to: o Soil o Water o Air o Related natural resources On: o Agricultural land o Grazing lands o Wetlands o Wildlife habitat o Forest land. – Assistance to producers: o In complying with federal, State, and tribal environmental laws o Who contribute to environmental enhancement – Assistance to producers in making beneficial, cost effective changes to: o Cropping systems o Grazing management o Manure and nutrient management o Integrated pest management o Irrigation water management o Land uses, or o Other needed measures. – Consolidation and simplification of the conservation planning process to reduce administrative burdens on producers.	**Purpose of Program** ▪ 515.13 (a) The EQIP objectives are to promote agricultural production and environmental quality as compatible national goals, and to optimize environmental benefits by: 1. Assisting producers in complying with local, state and national regulatory requirements concerning – soil, water and air quality – wildlife habitat – surface and ground water conservation 2. Avoiding, to the maximum extent practicable, the need for resource and regulatory programs by assisting producers in protecting soil, water, air and related natural resources and meeting environmental quality criteria established by Federal, State, tribal, and local agencies. 3. providing flexible assistance to producers to install and maintain conservation practices that enhance soil, water, related natural resources, and wildlife habitat while sustaining production of food and fiber. 4. assisting producers make beneficial, cost effective changes to cropping systems, grazing management, nutrient management associated with livestock, pest or irrigation management or other practices on Ag land. **5.** consolidating and streamlining conservation planning and regulator compliance procedures to reduce administrative burdens on producers and the cost of achieving environmental goals.	+ Agriculture production benefits may increase. + Reduces need for environmental regulations and enforcement costs. + A more flexible, streamlined administration may decrease producer's time and confusion. + Will increase the number of eligible participants due to the fact that those that are required to implement practices due to regulatory reasons are eligible for cost-share. o Net benefits of the shift from environmental maximization to agricultural production are unknown. – Environmental enhancement benefits will decrease. – May decrease share of funds for purposes solely for environmental enhancement. – May have an overall negative impact on SWAPA due to the shift of increasing emphasis on agriculture production
Contract Length ▪ 7 CFR 1466.21 (b) an EQIP contract shall: o (2) Be for a duration of not less than 5 years nor more than 10 years. ▪ Reference 515.111 (a) in manual	**Contract Length** ▪ 7 CFR 1466.21 (b) an EQIP contracts shall: o (2) Be for a durations that terminates one year after completion of the last practice but not more than 10 years. o Reference 515.111 (a) in manual	+ Progressive planning may be instituted more efficiently. + Potentially increases the number of producers interested. + May increase overall producer satisfaction. – Number of contracts will probably increase per producer, thereby increasing program administrative cost. – Annual management practices may be maintained for shorter periods, therefore decreasing long term benefits.
Multiple Contracts ▪ 7 CFR 1466.21 (d) There is a limit of one EQIP contract at any one time for each tract of agricultural land, as identified with a FSA tract number, determined at the time of the application for EQIP assistance. Subject to the payment limitation, a participant may have subsequent EQIP contracts for different natural resource needs or concerns following completion of a previous EQIP contract on the same tract. ▪ Reference 515.111 (e) in the manual	**Multiple Contracts** ▪ 7 CFR.21 (d) There is no limit on the number of EQIP contracts that any individual or entity may have at any given time. EQIP payments to an individual or entity are subject to the payment limitations identified in section 1466.23(b).	+ Increases the flexibility of the planning process, and will allow progressive planning. + Risk to producer is decreased which also decreases the likelihood of contract cancellation or modification. – Will promote the use of non-RMS planning. – Efficiency of technical and administrative assistance may decrease due to multiple, small contracts.
Contract Modifications	**Contract Modifications**	+ Due to the increase in flexibility, satisfaction of the overall program will

Old Program Rules	Proposed Changes	Effects
▪ 515.112 (a) Contract modifications are not allowed if changes in practices to be performed are significant enough to warrant a change in the initial application evaluation ranking ▪ 515.112 (c) Increased Obligations may not be increased to a contract due to cost inflation.	▪ Deleted ▪ Deleted	increase. – Cost control may be lessened; more likely to promote cost inflation.
Offer Index ▪ 7 CFR 1466.6 EQIP Plan of Operations (1) When considering the acceptability of the plan, NRCS will consider whether the participant will use the most cost-effective conservation practices to solve the natural resource concerns and maximize environmental benefits per dollar expended.	**Offer Index** ▪ 7 CFR 1466.6 EQIP Plan of Operations (1) When considering the acceptability of the plan, NRCS will consider whether the participant will use the most cost-effective conservation practices to solve the natural resource concerns and optimize environmental benefits.	– Left up to individual states to determine how to optimize benefits. Overall effect could be a decrease in the overall benefits per treated resource concern.
Application Evaluation ▪ 7 CFR 1466.20 (f) NRCS will rank all applications using criteria that will consider: o (1) The environmental benefits per dollar expended o (2) A reasonable estimate of the cost of the conservation practices, the program payments that will be paid to the applicant, and other factors for determining which applications will present the least cost to the program	**Application Evaluation** ▪ 7 CFR 1466.20 (e) NRCS will evaluate all applications using criteria that will consider: o (1) Optimizing environmental benefits o (2) Cost-effective conservation practices	o Same as Offer Index (above).
Funding Decisions ▪ 7CFR Sec. 1466.4 Program Requirements (e) Fifty percent of the available program funds will be targeted to livestock-related natural resource concerns, including concerns on grazing lands and other lands directly attributable to livestock, measured at the national level.	**Funding Decisions** ▪ 7CFR Sec. 1466.4 Program Requirements (e) Sixty percent of the available program funds will be targeted to livestock-related conservation practices.	o Probably no effect since 62% of previous EQIP program funds were obligated to livestock related practices.
Third Party Vendors ▪ 7CFR Sec. 1466.8 ▪ (a) NRCS State Conservationist may utilize technical assistance from other qualified personnel	**Third Party Vendors** ▪ 7CFR Sec. 1466.8 ▪ A producer may utilize technical assistance from qualified personnel of other Federal, State and local agencies or Indian tribes. ▪ *Added* (c) The State Conservationist will develop payments rates and methods for third-party providers.	o
Payments made in first year of Contract ▪ 7 CFR Sec. 1466.23 (e) CCC expenditures under a contract entered into during a fiscal year shall not be made until the subsequent fiscal year.	**Payments made in first year of Contract** ▪ Deleted	+ More expensive practices may be implemented sooner resulting in the treatment of critical resources more efficiently.
Application Evaluation ▪ 7 CFR 1466.20 (f) NRCS will rank all applications using criteria that will consider: o (1) The environmental benefits per dollar expended o (2) A reasonable estimate of the cost of the conservation practices, the program payments that will be paid to the applicant, and other factors for determining which applications will present the least cost to the program	**Application Evaluation** ▪ 7 CFR 1466.20 (e) NRCS will evaluate all applications using criteria that will consider: o (1) Optimizing environmental benefits o (2) Cost-effective conservation practices	– Would expect overall net benefits to decrease

Old Program Rules	Proposed Changes	Effects
LRF and Beginning Farmer ▪ Not identified	**LRF and Beginning Farmer** ▪ 7 CFR 1466.23 (a)(1) The maximum direct Federal share of cost-share payments to a Limited Resource Producer or Beginning Farmer and Rancher may be up to 90 percent, as determined by the State Conservationist.	+ Broadens the base of potential applicants and increased contracts. – Increases the potential for incomplete/terminated contracts due to the increased risk involved with new farmers/ranchers. – Contract size, dollar amount and extents will be smaller per contract. The Technical and administrative costs will become less efficient due to fixed TA costs.
Methods of Cost-share ▪ 515.101 (h) Payment levels and rates will be based on either of the following methods: – The percent of actual costs – The percent of actual costs Not-To-Exceed (NTE) rate limits.	**Methods of Cost-share** ▪ 515.101 (e) Payment levels and rates will be based one of the following methods In accordance with GM 120, Part 404: ▪ The percent of actual costs (not to exceed an average) (AA). ▪ The percent of actual costs Not-To-Exceed (NTE) a maximum (AM). ▪ Average Cost (AC) ▪ Flat rates (FR)	+ Increased cost control by administrators – May increase financial burden on producers who have unusually large or expensive projects. – May increase administration burden in some states.
Cost-share Practice limitation ▪ Not applicable	**Cost-share Practice limitation** ▪ Additional guidance provided through NRCS Chief Bruce Knight: As of July 31, 2002, and for FY2002 contracts only, any "single practice" that has a total cost exceeding $100,000 will be cost-shared at no more than 50 percent. Also, the total amount of the contract is not limited by this decision.	+ Could allow more funds for additional practices/contracts – Unconditional reduction in cost share provides great incentive for abusing the system – Middle sized producers would bear a greater burden when capped by a practice cost share limitation – Practice cost share limitation effects only 1.5% of nation's animal feeding operations
Comprehensive Nutrient Management Plan ▪ Not identified	**Comprehensive Nutrient Management Plan** ▪ 7 CFR Sec. 1466.6 (5) a provision for the development and implementation of a comprehensive nutrient management plan for plans of operation that contains an animal waste control or treatment facility.	+ No change or potential for small change since most states required CNMPs previously.

Estimating the Benefit Cost Ratios - Calculation Constants

Table 2 lists some parameters that are held constant across all categories of benefits for the benefit cost ratio calculations and referenced by the worksheet tables of this assessment:

1. The historical average cost of providing Technical Assistance (TA) has been estimated to be equal to 26 percent of EQIP funds;
2. Practice cost share was assumed to be 75 percent;
3. To account for increasing of the share of EQIP funds devoted to livestock waste treatment to 50 percent for the new program scenarios, the shares of EQIP funds for each of the other benefit categories was reduced to 64.4 percent of what it had been;
4. For land treatment practices the varying contract lengths and flow of benefits over time were explicitly accounted for as previously described; for ease of calculation they were repeated in this table;
5. A discount factor of 7 percent was used for calculating Net Present Values of cost and benefit streams to reflect the time value of money, and an inflation factor of 2 percent was also assumed;
6. EQIP fund availability is as shown in Table bc13, with the Klamath valley and irrigation water savings designated funds were considered as an "add-on" to the overall pool of funds for EQIP. For 2002, $2.25 million of the Klamath funds will be distributed. It was assumed that the remainder of the funds would be evenly distributed over the remaining 5 years of the program; and

7. A scenario of continuing old rules with a level funding of $200 million per year was used as the benchmark for this analysis.

Table 2. Key assumptions and constants used throughout the benefit cost spread sheet analysis

Proportion of EQIP for TA	0.26
Proportion of EQIP for Cost Share	0.74

	USLE Reduction	Grazing Productivity	Water Savings	Wind Erosion	Non-waste Nutrient	Wildlife Habitat	Livestock-related
Historical cost share	0.33	0.35	0.35	0.34	0.48	0.46	0.63
Cost share for practices (used in Table 15 and Table 19)	0.75	0.75	0.75	0.75	0.75	0.75	0.75

New benefit category share of funds as prop. of old. (non livestock waste practices)	0.644

Proportion of full benefits over 10 years by benefit class

(funds contracted in year 1):	USLE	Grazing	Irrigation	Wind Erosion	Non-Waste Nutrient	Wildlife
Average Practice Life	5.1	12.4	18.3	7.8	5.0	12.8
Year 1	0.0	0.0	0.0	0.0	0.0	0.0
Year 2	0.9	1.0	1.0	0.7	1.0	0.5
Year 3	1.0	1.0	1.0	0.8	1.0	0.7
Year 4	1.0	0.9	1.0	0.8	1.0	0.8
Year 5	0.9	0.9	1.0	0.9	0.5	0.9
Year 6	0.8	0.8	1.0	0.8	0.3	1.0
Year 7	0.7	0.8	1.0	0.7	0.2	0.9
Year 8	0.6	0.7	1.0	0.7	0.1	0.9
Year 9	0.5	0.7	1.0	0.6	0.0	0.9
Year 10	0.5	0.6	1.0	0.5	0.0	0.9
Combining stream of benefits and discount factors	5.11	5.63	6.44	4.78	3.42	5.38

Discount factor plus 1.0 (7.0%)	1.070
Composite 10 year discount factor (7.0%)	7.515
Anticipated Inflation Rate (2.0%)	1.020
Combined discount & inflation plus 1 (9.0%)	1.090
Composite 10 year discount factor (9.0%)	6.995

EQIP Program Funds (millions): year	New	Irrigation Water Savings	Old
2002	400	27.25	200
2003	700	54.55	200
2004	1000	69.55	200
2005	1200	69.55	200
2006	1200	69.55	200
2007	1300	69.55	200
Total	5800	360	1200

	USLE Reduction	Grazing Productivity	Water Savings	Wind Erosion	Non-waste Nutrient	Wildlife Habitat	Livestock-related
Historical share of funds	0.054	0.138	0.102	0.037	0.019	0.036	0.61348
Share of funds used throughout this spreadsheet	0.054	0.138	0.102	0.037	0.019	0.036	0.61348

Resource totals (Agricultural Statistics, 2001):

Used for crops	348,701,000
Used for grazing	647,677,000
Irrigated land in farms	55,058,000

Per unit benefits used in analysis

			($/Acre)				($/AU)
	USLE Reduction	Grazing Productivity	Water Savings	Wind Erosion	Non-waste Nutrient	Wildlife Habitat	Livestock-related
Benefit per acre (in base analysis)	43	15.01	13.68	4.98	6.7	6.19	46.63
Benefits per acre used in sensitivity	43	15.01	13.68	4.98	6.7	6.19	46.63
(change this second row for sensitivity analysis)							

In addition, the interpretation of the stream of individual practice benefit values in tables 3, 6, 8, 10, and 12, is the proportion of full benefits occurring in the year indicated. It was assumed that no benefits would occur in the first year, since during that year the contract would likely not be finalized till mid-year and implementation would start at some time after that.

Practice Costs and EQIP Fund Shares by Resource Concern

Appendix Table A1 shows a summary by practice of approved and implemented practices for EQIP from 1996 through the first quarter of 2002. This approach classified those practices according to the category of benefits that they were expected to produce, and then evaluated each set of benefits separately. The categories of benefits that were evaluated include:

- sheet and rill (USLE) water erosion reduction;
- animal waste management on animal feeding operations;
- enhanced forage production on grazing lands;
- increased irrigation water use efficiency;
- improved air quality through reduced wind erosion;
- improved wildlife habitat benefits of wildlife viewing and hunting; and
- reduced fertilizer expense through nutrient management not associated with animal waste.

For these categories of benefits, except for animal waste, the "implemented", or installed practices were used to calculate per-unit cost share and total cost, then the "approved", or contracted practices were used to calculate benefit categories of overall EQIP cost share. Data for the costs of animal waste treatment were taken from the USDA CNMP Cost and Capability Assessment. The "implemented" data were used for calculating cost share because it included the total costs reported by the producers. These calculations required some assumptions to convert from treatment units to treated acres, as described in separate sections below.

It is important to note that the EQIP report of historical acres is of acres of practices applied, not of acres treated. Any particular acre may have had several practices applied to it, and, a given acre of practice may generate benefits in several categories. Consequently, for this approach adding up benefits across categories is appropriate, but adding up practice acres does not measure the total of acres receiving some treatment. Also, to calculate individual Benefit Cost ratios by benefit category, one must ignore the fact that the cost of some of the practices may be counted in other benefit categories. Consequently, after looking at all individual benefit categories, a comparison of the sum of benefits across categories to the actual overall EQIP program costs for calculating an overall benefit cost ratio was made. In addition, net benefits for all categories were calculated. With this approach, an accounting for approximately

80% of overall practice acres was made. Some practices were specified in numbers, or units, such as number of "pesticide containment facilities", for which benefit estimates were not available.

Sheet and Rill Erosion (USLE) Reduction

Table 3 lists the practices that were classified as reducing sheet and rill soil erosion (USLE) when applied either by themselves or in combination with each other. A few of these practices used to prevent soil eroded from a land area from leaving the area are not reported in acreage units, therefore assumptions (Table 2 footnotes) were used to convert the units of treatment (generally linear feet, as in feet of terraces) to acres treated. It was also assumed that on average, two practices were applied per acre. With these calculations it was found that as of the first quarter of 2002, these practices had been implemented on 887 thousand acres.

Table 3 indicates that historically these practices received 8.4 percent of EQIP cost share funds and had an average cost share of $27.81 per acre while the average total cost was $85.08 per acre (excluding the cost of government provided technical assistance). Note that these costs are not an "annual" cost, but rather a "contract" cost and reflect the total cost of applying the practice as contracted, i.e., perhaps the sum of costs over three or four years. Table 2 indicates that the most prevalent practices in terms of acres protected were Residue Management associated with use of No-Till, Strip Till, and Mulch Till. However, the most extensive practices in terms of cost share expended were Reduced Till Residue Management and Terracing, accounting for 67 percent of the cost share on the erosion reducing acres.

Table 4 shows the life and expected benefit stream over time for each practice, and the cost-share weighted averages over the group of practices. The average practice life for the USLE practices was found to be 5.1 years, with nearly full benefits occurring in years two through 6, followed by a gradual taper to 50 percent of benefits in year 10.

Determining the estimated benefit for the USLE reductions required interpretation of available literature. Studies by Feather et. al (1999) and Claassen et. al (2001) were used to develop water induced erosion control benefit estimates for this assessment. Those studies were based primarily on the erosion control benefits obtained from the Conservation Reserve Program (CRP) and Conservation Compliance (CC). The CRP removed land from agricultural production for a period of 10 years and protected it with a vegetative conservation cover while the CC required that farmers receiving government benefits reduce the soil erosion rates on Highly Erodible land that they were continuing to crop, though not necessarily to the erosion loss tolerance (T) level. Note that these benefit studies included only a partial estimate of the variety of possible program benefits; therefore this analysis remains an underestimate of the total benefits available from erosion reduction. Also, each program enrolled different land with different inherent erodibility. In the early CRP years, erosion reduction was the primary goal, while in later years more weight was given to wildlife and other environmental considerations.

Table 3. Historical EQIP data on practices reducing water induced sheet and rill soil erosion (USLE).

			Approved Contracts			Implemented Contracts (excludes contract units not cost shared)						
	Practice Definition	Units	Contracts	Units	Cost Share	Contracts	Units	Cost Share	Total Cost	Acre Divisor[a]	Total Cost/ac	Acres[b] Protected
329A	Residue Management, No-Till and Strip Till	AC	29,828	2,549,677	18,826,296	8,892	493,323	8,034,476	14,953,683	1	30.31	493,323
600	Terrace1	FT	9,878	84,207,035	18,291,508	4,141	19,399,362	8,410,459	21,690,701	435.6	487.05	44,535
342	Critical Area Planting1	AC	12,849	425,935	6,588,314	4,618	175,419	2,685,059	25,361,525	1	144.58	175,419
329B	Residue Management, Mulch Till	AC	17,815	2,895,192	5,972,819	221	377,827	127,302	156,033	1	0.41	377,827
340	Cover Crop	AC	13,151	777,327	3,777,254	2,791	102,135	1,345,112	4,889,644	1	47.87	102,135
328	Conservation Crop Rotation	AC	89,139	13,436,125	3,370,572	15,725	218,859	1,767,221	2,929,007	1	13.38	218,859
344	Residue Management, Seasonal	AC	54,571	8,231,184	1,484,099	10,526	198,042	835,521	3,261,113	1	16.47	198,042
393	Filter Strip1	AC	5,470	266,446	1,305,333	916	51,047	313,326	542,999	1	10.64	51,047
386	Field Border	FT	3,668	14,668,441	833,822	893	1,020,219	292,900	414,942	66	26.84	15,458
327	Conservation Cover1	AC	3,706	294,805	640,065	764	6,026	177,324	342,513	1	56.84	6,026
393A	Filter Strip2	AC	394	57,989	348,953	100	34,406	88,692	122,740	1	3.57	34,406
330	Contour Farming	AC	13,724	2,034,659	302,132	3,514	27,448	164,729	191,882	1	6.99	27,448
329C	Residue Management, Ridge Till	AC	1,294	151,645	231,111	4,286	7,782	127,302	156,033	1	20.05	7,782
585	Contour Stripcropping	AC	567	37,175	214,194	148	7,043	63,888	99,574	1	14.14	7,043
586	Stripcropping	AC, Field	304	24,599	200,474	68	4,426	82,294	116,475	1	26.32	4,426
716	Anion Polyacrylamide (PAM) Ero. Cont.	ac.	238	23,333	178,408	81	7,022	94,952	152,688	1	21.74	7,022
332	Contour Buffer Strips	AC	140	3,815	59,687	32	1,668	27,560	30,940	1	18.55	1,668
311	Alley Cropping	AC	397	1,485	47,033	0	0	0	0	1	0.00	0
342A	Critical Area Planting2	AC	45	27,717	31,597	8	13	5,169	8,911	1	685.46	13
331	Contour Orchard and Other Fruit Area	AC	298	1,294	23,421	23	63	3,309	5,741	1	91.13	63
758	Strip - Intercropping	ac.	5	851	9,672	5	851	9,672	9,672	1	11.37	851
327A	Conservation Cover2	AC	43	1,464	8,107	11	18	3,703	5,247	1	291.50	18
741	Vegetative Buffer Strips	ac.	6	8	1,140	2	1	396	396	1	396.00	1
Totals			257,530		62,746,011	57,765	22,133,000	24,660,366	75,442,459			886,706
Average per acre (based on implemented)								27.81	85.08			
	Total Program Cost Share				746,281,930							
	USLE Reducing Practice Share of Total				0.084							

[a]Divisors used in this assessment for converting from units of treatment to acres protected are:

For terraces, assume interval of 100 feet, so that 435.6 feet of terrace protect 1 acre.

For field border, assume a 20 acre square field, 1320 linear foot protects 20 acres, or 66 feet per acre.

[b]Total acres protected is sum of individual practice acres, divided by 2.0, to reflect that EQIP plans typically use more than one of the listed practices is generally included in the treatment plan.

Units implemented excludes those for which no cost sharing was given

Table 4. Distribution of benefits over time for practices reducing USLE erosion.

Practice	Definition	Historical Cost Share	Practice Life	Proportion of Full Annual Benefits Occurring by Year (year 1 is funding and contract year)									
				1	2	3	4	5	6	7	8	9	10
329A	Residue Management, No-Till and Strip Till	18,826,296	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
600	Terrace1	18,291,508	10	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
342	Critical Area Planting1	6,588,314	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
329B	Residue Management, Mulch Till	5,972,819	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
340	Cover Crop	3,777,254	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
328	Conservation Crop Rotation	3,370,572	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
344	Residue Management, Seasonal	1,484,099	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
393	Filter Strip1	1,305,333	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
386	Field Border	833,822	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
327	Conservation Cover1	640,065	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
393A	Filter Strip2	348,953	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
330	Contour Farming	302,132	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
329C	Residue Management, Ridge Till	231,111	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
585	Contour Stripcropping	214,194	5	0.0	0.5	1.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2
586	Stripcropping	200,474	5	0.0	0.5	1.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2
716	Anion Polyacrylamide (PAM) Ero. Cont.	178,408	1	0.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
332	Contour Buffer Strips	59,687	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
311	Alley Cropping	47,033	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
342A	Critical Area Planting2	31,597	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
331	Contour Orchard and Other Fruit Area	23,421	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
758	Strip - Intercropping	9,672	5	0.0	0.5	1.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2
327A	Conservation Cover2	8,107	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
741	Vegetative Buffer Strips	1,140	10	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Totals		62,746,011											
Average, weighted by Cost Share			5.1	0.0	0.9	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.5

Feather et al. (1999) were concerned with optimal targeting for CRP enrollments for generation of environmental benefits. They followed a three-step methodology:

1. CRP acreage creates physical effects;
2. Physical effects translate into biological effects; and
3. Biological results affect consumer welfare.

Feather et. al's benefits were mostly accounted for by the following three components, all calculated for a 10-year program, NPV at 4 percent discount rate:

1. Public works cost reduction for sediment based on a 45 million acre CRP with soil erosion reductions of 750 million tons per year, $3029 million;
2. Air quality, $548 million; and
3. Recreation, $8,676 million, estimated partially based on CRP enrollments of 45 million and 34 million acres, depending upon the type of recreation benefit derived.

Of those three categories of benefits, the first and the third were added together ($3,029 plus $8,676 equals $11,705, all in millions). Air quality benefits of soil erosion reduction were accounted for in a different EQIP benefit category. The $11,705 million benefit NPV was then converted to an equivalent 10-year stream of benefits with a 7% discount factor (divide $11,705 by the composite 10 yr discount factor of 7.515 from Table 2), resulting in annual benefits of $1,558 million. The annual benefits were then divided by tons (750 million) and acres (45 million) to arrive at an annual per-ton value of $2.08 and an annual per-acre value of $34.74 (Table 5).

In a study of alternative ways of providing incentives to farmers for environmental improvements, Claassen et al. (2001) estimated benefits for both the CRP and for Conservation Compliance. For CRP they found 406 million tons of erosion reduction annually, but this they explained was likely an understatement for several reasons. If the mid-point of the range of 30 to 36 million acres enrolled since program inception is used, 33 million acres, the per-acre reduction is 12.3 tons per acre. The estimate of erosion reduction in the Feather study was higher since it was based on original program estimates when enrollment priority was given to erosion reductions. Claassen reported benefits of $694 million per year for reduced soil erosion and $704 million per year for improved wildlife habitat. The total of $1,398 million annual benefits is equivalent to $3.44 per ton of rate reduction, or $42.31 per acre (see Table 5).

Claassen et al. (2001) also estimated a partial estimate of the economic benefits due to Conservation Compliance. The estimate was said to be partial, not only because of not counting all the benefits, but also a likely understatement of the acres treated due to Conservation Compliance requirements. The estimated soil erosion reduction on HEL lands was 323 million tons per year. There were 91 million acres with approved CC plans, for a rate reduction of 3.5 tons per acre per year. The estimate of annual non-market benefits for that soil erosion reduction was $1,400 million, or $4.33 per ton and $15.16 per acre.

For on site productivity losses, two major components were included. First, the loss in productive value as the topsoil is eroded away. Second, the value of the lost nitrogen and phosphorus fertilizer that is carried away with the topsoil. In the ERS Agricultural Resource and Environmental Indicators (AREI, 1997) publication a methodology for valuing productivity losses from erosion is given. In general terms that method assumes linear productivity decreases as the topsoil layer of is eroded away. For instance, a typical plow layer 7 inches deep weighs 1000 tons and so a topsoil layer of 10.5 inches deep weighs 1500 tons. If annual rent from the land is $150 per acre, then the annual value of each ton of soil is ($150/1500) or $0.10 per ton. Obviously, there are two main problems with this argument: 1) the decrease in productivity value from the loss of the first ton to the loss of the last ton is obviously not linear (Benson et al, 1989); and 2) both product and input prices would be expected to change as the soil was lost on some proportion of total acres. Calculations like this would be very site specific, varying tremendously across the U.S. according to soil, climate, management, etc. For this assessment the $0.10 per ton per year estimate was used. As a supporting argument for this small value to the productivity loss, a comprehensive RCA in 1987 found that if the then current farming practices were to continue for 100 years, the loss in productivity due to erosion would be approximately 3 percent (USDA, 1989).

That RCA study also estimated the value of fertilizer nutrients lost with erosion. Some more general assumptions based on data from Miller et al. (1998) were made. On average topsoil consists of two percent organic matter, or 1.16 percent carbon. That organic matter would have, on average, a carbon nitrogen ratio of 10 to 1. Consequently, each ton of soil that is eroded contains 2.32 pounds of nitrogen that the farmer would need to replace. The soil also

contains 0.05 percent phosphorus, or 1 pound per ton of soil. With phosphorus and nitrogen prices of $0.25 and $0.15 per pound, the lost nutrients in each ton of soil erosion are valued at $0.60.

Analyses of historical EQIP data indicate USLE reductions of 8.6 tons per acre per year can be attributed to the program. This estimate results in a large Benefit/Cost ratio, but it is assumed that EQIP funds would be targeted to situations where the largest erosion reductions would occur. Analysis of National Resource Inventory (NRI) data and EQIP data indicate that in the period since 1992, several million acres of farmed cropland have had USLE reductions exceeding 10 tons per acre per year. Analysis of the 1997 NRI in appendix 2 shows that the new program can easily maintain that 8.6 tons per acre though the life of the farm bill.

With the data from the two studies and other assumptions summarized here, the per-acre benefit estimate for USLE reductions is calculated as shown in Table 5. The results in per-acre annual benefits are $0.86 for saved soil productivity, $5.16 from reduced loss of nutrients, and $36.98 from improved water quality, for a total of $43.00.

Table 5. Estimate of per-ton benefits from reduced sheet and rill erosion

Item	Annual Erosion Rate Reduction (tons/acre)	Annual Benefits ($/ton)	Annual Benefits ($/acre)
Offsite benefits:			
CRP, early program years	16.7	2.08	34.74
CRP, program average	12.3	3.44	42.31
Conservation Compliance	3.5	4.33	15.16
Used for this EQIP analysis[a]	8.6	4.30	36.98
On-site benefits:			
Soil productivity	8.6	0.10	0.86
Nutrients saved	8.6	0.60	5.16
Used for this EQIP analysis[a]	8.6	0.70	6.02
Total Annual Per-Acre Benefits[b]	8.6	5.00	43.00

[a]Historical EQIP data for 2001 showed a reduction from 11.5 to 2.9 tons per acre per year on 1 was excluded because its reduction was clearly a data error, with a rate of 50 times the average

[b]This total reflects the total tons/acre of soil erosion from which both off-site and on-site benefits are calculated

Grazing Land Productivity Improvements

Table 6 shows a list of EQIP practices classified as having an impact on grazing land productivity, accounting for 2.4 million acres of implemented treatment. Since it is rare that only single grazing related practices are installed, it was assumed that the average treated acre would use 2 of the listed practices. Average cost share and total cost were $25.94 and $73.65, for an average cost share of 35.3 percent. The share of these practices in overall EQIP funding was 21.4 percent. Note that as in the case of the USLE reduction, some practices were in non-acre units and a conversion factor was used to estimate the number of non-acre units used to treat an average acre. For grazing land the practices accounted for were those resulting in increased forage production. Practices expected to provide benefits in other environmental areas (such as wildlife habitat and water quality) are partly accounted for in the other benefit categories. Also, some practices were assumed to be "associated" with practices directly benefiting productivity improvements and were also included, such as fencing and land clearing. The practices included in this benefit category were estimated to account for 21.4 percent of EQIP funds under the old program and 13.8 percent (64.4% of 21.4%) under the new program.

Table 7 shows the life and expected benefit stream over time for each practice, and the cost-share weighted averages over the group of practices. The interpretation of the stream of benefits values is the proportion of full benefits occurring in the year indicated. It was assumed that no benefits would occur in the first year, since during that year the contract would likely not be finalized till mid-year and implementation would start at some time after that. The average practice life for the grazing improvement practices was found to be 12.4 years, with nearly full benefits occurring in years 2 through 7, followed by a gradual taper to 60 percent of benefits in year 10. For this analysis the benefits occurring in years beyond the first 10 were ignored.

Namken and Flanagan report that practices such as these resulted in an average productivity increase of 1.3 Animal Unit Months (AUMs) per acre, and that the AUMs were valued at $11.10 each, resulting in per acre value of $14.43. The $14.43 value was updated from year 2000 to year 2002, assuming 2 percent inflation per year, which results in a 2002 grazing land improvement benefit of $15.01 per acre. It is probable that many of these practices were implemented in situations where the primary and or secondary purposes were something other than improved forage production, such as for wildlife habitat or water quality enhancement; however, those benefits were not able to be accounted for.

Table 6. Historical EQIP data on practices benefiting grazing productivity

Practice	Defintion	Units	Approved: Number Contracts	Approved: Number Units	Approved: Cost Share	Acre Divisor[a]	Implemented (excludes contract units not cost shared): Number Contracts	Number Units	Acres Protected	Cost Share	Total[b] Cost
382	Fence	FT	34,095	106,459,403	52,126,285	66.00	11907	35,354,090	535,668	18,092,862	51,812,234
512	Pasture and Hay Planting	AC	29,687	1,628,256	33,796,511	1.00	12034	537,735	537,735	13,777,560	30,255,077
314	Brush Management	AC	19,931	2,233,018	27,002,129	1.00	7055	586,419	586,419	11,053,384	37,565,149
614	Trough or Tank	NO.	24,449	15,532,432	18,189,413	12.50	9097	6,845,038	547,603	6,814,304	27,596,069
528A	Prescribed Grazing	AC	133,063	91,771,580	15,030,305	1.00	27980	1,625,790	1,625,790	7,421,948	16,923,590
550	Range Planting	AC	4,943	417,877	5,611,698	1.00	1607	116,180	116,180	1,564,645	2,999,409
574	Spring Development	NO.	3,847	52,482	4,244,140	0.05	1490	15,687	313,740	1,480,194	4,610,798
575	Animal Trails and Walkways	AC	1,168	693,612	1,864,507	1.00	445	286,893	286,893	727,051	1,127,536
472	Use Exclusion	AC	10,432	955,917	1,013,697	1.00	1744	151,409	151,409	375,976	1,540,034
762	Planned Grazing System	ac.	2,302	3,177,840	288,958	1.00	509	33,317	33,317	126,288	187,655
548	Grazing Land Mechanical Treatment	AC	458	147,468	238,444	1.00	93	7,505	7,505	64,484	89,600
510	Pasture and Hayland Management	AC	10,805	1,215,627	167,781	1.00	2315	5,777	5,777	49,616	64,102
460	Land Clearing	AC	51	2,014	78,667	1.00	12	442	442	43,459	98,979
	Totals			224,287,526	159,652,535				2,374,239	61,591,771	174,870,232
	Grazing Share (percent) of Total EQIP				0.214						
	Average annual costs per acre									25.94	73.65

[a]Divisors:
Fences: on two sides of square 40 acres or 2640 feet per 40 acres
Springs: one per 20 acres
Tank: units are gallons, assume a 500 gallon tank per 40 acres
Also, acres protected is sum over practices divided by 2.0 to account for a given plan generally involving at least 2 of the listed practices.

[b]Total cost, not including Technical Assistance.

Table 7. Distribution of benefits over time for practices benefiting grazing productivity

	Practice Definition	Historical Cost Share	Practice Life	Proportion of Full Annual Benefits Occurring by Year (year 1 is funding and contract year)										Assumed benefit Proportions	
				1	2	3	4	5	6	7	8	9	10	% FA	%TA
314	Brush Management	27,002,129	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.9	0.1
382	Fence	52,126,285	20	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.1
460	Land Clearing	78,667	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.8	0.2
472	Use Exclusion	1,013,697	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.7	0.3
510	Pasture and Hayland Management	167,781	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0	0.1	0.9
512	Pasture and Hay Planting	33,796,511	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.9	0.1
528A	Prescribed Grazing	15,030,305	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0	0.9	0.1
548	Grazing Land Mechanical Treatment	238,444	5	0.0	1.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.7	0.3
550	Range Planting	5,611,698	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.9	0.1
574	Spring Development	4,244,140	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.1	0.9
575	Animal Trails and Walkways	1,864,507	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.8	0.2
614	Trough or Tank	18,189,413	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.9	0.1
762	Planned Grazing System	288,958	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0	0.9	0.1
	Totals	159,652,535													
Average, weighted by Cost Share			12.4	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.88	0.12

Irrigation Water Savings

Table 8 shows the practices assigned to the benefit category of irrigation water savings. Under the old program these practices accounted for 15.9 percent of the funds and under the new program 10.2 (64.4% of 15.9%) percent. Note that a minimum allocation of funds to these practices is specified for each year under the new program; consequently, the allocation does not decrease as much to account for increased animal waste treatment as for the other benefit categories. The program treated 2.9 million acres (implemented No. Units) with a cost share of $22.5 per acre and total cost of $64.69 per acre. Table 7 shows that a large set of practices reported in units rather than by acres, but it can be assumed that these practices were "associated" with the per-acre practices. Therefore, their costs were added to the sum of costs across treated acres. Analysis of NRCS agency Performance Resource Management System (PRMS) data indicated that historical EQIP irrigation practices had resulted in a net savings of 5.41 acre-inches per acre.

Table 9 shows the life and expected benefit stream over time for each practice, and the cost-share weighted averages over the group of practices. The average practice life for the irrigation efficiency improvement practices was found to be 18.3 years, with full benefits occurring in years 2 through 10. For this analysis the benefits occurring in years beyond the first 10 were ignored.

Presumably, any water saved would be available for alternative uses such as by municipalities, utility generation, and wildlife habitat enhancement. Therefore, a possible value that could be assigned to the saved water, is the price that competing uses would be willing to offer. Since those prices are not available, the saved water was valued conservatively at the average that the farmers have paid or expended to obtain the water. It is assumed that the farmers could achieve a net reduction in irrigation water used by any or all of the following three methods:

- convert from irrigation to dryland production;
- convert to a crop or land use requiring smaller applications of water; and
- maintain the same crop, but improve irrigation efficiency.

The ERS AERI publication reported 29.8 million acres irrigated with groundwater having acquisition cost of $32/acre foot and 15.1 million acres irrigated with off-farm surface water at $41/acre foot, including supply cost and variable cost. The weighted average value of the water is then $35.03, and with updating for four years of inflation at 2% to update from 1998 to 2002, results in an estimated cost of $35.03/acre foot, which given the 5.41 acre-inch savings per year and assuming a 20 percent loss in storage and transmission, results in an annual per-acre benefit of $13.68.

Table 8. Historical EQIP practices benefiting irrigation efficiency

Practice Code and Name		Units[a]	Approved: Number of Contracts	Approved: Number of Units	Approved: Cost Share	Implemented (excludes contract units not cost shared): Number of Contracts	Implemented: Number of Units	Implemented: Cost Share	Implemented: Total Cost	Per-Acre: Cost Share	Per-Acre: Total Cost
442	Irr System Sprinkler	no & ac	6361	2114925	35,486,577	3033	1,095,216	21,333,028	51,316,580	19.48	46.86
441	Irr System MicroIrr	no & ac	2104	3816732	11,444,309	853	1,160,412	5,770,473	22,464,719	4.97	19.36
449	Irr Wat Management	AC	46167	6158377	3,459,929	6509	280,271	1,540,054	3,954,249	5.49	14.11
466	Land Smoothing	AC	556	175259	995,004	176	56,363	399,721	938,839	7.09	16.66
462	Precision Land Forming	AC	112	351100	324,875	34	248,861	178,833	379,716	0.72	1.53
640	Water spreading	AC	64	75901	111,095	20	31,394	42,788	88,081	1.36	2.81
744	Land Grading	ac.	15	4310	32,284	4	2,074	19,432	43,437	9.37	20.95
738	Soil Salinity Control	ac.	110	31731	21,927	12	240	9,944	21,787	41.43	90.78
746	Rice Wat Control	ac.	97	7183	19,987	31	1,778	10,463	10,629	5.88	5.98
743	Improved Wat Application	ac.	542	43344	12,380						
Associated Practices[b]											
430 D	Irr Wat Convey. Pipeline, High-Press.	FT	7,358	15,815,978	28,287,002	3786	8,573,324	14,804,144	35,659,902		
430 E	Irr Wat Convey. Pipeline, Low-	FT	3,905	11,655,732	17,274,490	2060	5,723,846	9,556,878	26,277,786		
430 H	Irr Wat Convey. Pipeline, Rigid Gated P	FT	2,998	7,544,620	7,718,745	1531	4,529,418	3,811,504	10,234,957		
428 A	Irr Wat Convey. Ditch and Canal Lining1	FT	954	1,358,793	6,396,408	534	681,355	3,812,972	17,022,515		
447	Irr System, TailWat Recovery	NO.	625	1,762,769	2,667,454	197	1,025,220	1,243,479	10,881,891		
443	Irr System Surface and Subsurface	no &a	3,108	8,388,224	1,762,810	849	3,996,757	937,008	2,432,310		
436	Irr Storage Reservoir	no&a	187	2,613,186	1,272,561	95	1,498,048	715,371	2,261,284		
552 B	Irr Regulating Reservoir	NO.	80	298,208	299,448	35	107,777	168,995	1,404,015		
430 C	Irr Wat Convey. Pipeline, Nonreinforced	FT	37	67,797	249,748	15	12,623	97,307	159,404		
388	Irr Field Ditch	FT	185	531,332	249,101	56	144,527	82,263	141,224		
430 A	Irr Wat Convey. Pipeline, Aluminum Tubi	FT	78	105,668	242,431	28	35,571	102,647	206,665		
430 F	Irr Wat Convey. Pipeline, Steel	FT	180	28,786	98,536	62	8,809	40,602	117,901		
320	Irr Canal or Lateral	FT	45	127,583	75,910	15	40,914	25,552	50,316		
428 B	Irr Wat Convey. Ditch and Canal Lining2	FT	10	65,080	40,827	3	38,338	14,014	23,882		
	Totals[c]		56,128	12,778,860	118,543,838	10,672	2,876,609	64,717,472	186,092,089		
	Averages							22.50	64.69		

Table 9. Distribution of benefits over time for practices benefiting irrigation water use efficiency

		Practice Definition	Historical Cost Share	Practice Life	Proportion of Full Annual Benefits Occurring by Year (year 1 is funding and contract year)									
					1	2	3	4	5	6	7	8	9	10
442		Irr System Sprinkler	35,486,577	15	0	1	1	1	1	1	1	1	1	1
430	D	Irr Wat Convey. Pipeline, High-Press.	28,287,002	25	0	1	1	1	1	1	1	1	1	1
430	E	Irr Wat Convey. Pipeline, Low-	17,274,490	25	0	1	1	1	1	1	1	1	1	1
441		Irr System MicroIrr	11,444,309	10	0	1	1	1	1	1	1	1	1	1
430	H	Irr Wat Convey. Pipeline, Rigid Gated P	7,718,745	15	0	1	1	1	1	1	1	1	1	1
428	A	Irr Wat Convey. Ditch and Canal Lining1	6,396,408	20	0	1	1	1	1	1	1	1	1	1
449		Irr Wat Management	3,459,929	1	0	1	1	1	0.8	0.6	0.4	0.2	0.1	0
447		Irr System, TailWat Recovery	2,667,454	20	0	1	1	1	1	1	1	1	1	1
443		Irr System Surface and Subsurface	1,762,810	15	0	1	1	1	1	1	1	1	1	1
436		Irr Storage Reservoir	1,272,561	15	0	1	1	1	1	1	1	1	1	1
466		Land Smoothing	995,004	10	0	1	1	1	1	1	1	1	1	1
462		Precision Land Forming	324,875	10	0	1	1	1	1	1	1	1	1	1
552	B	Irr Regulating Reservoir	299,448	15	0	1	1	1	1	1	1	1	1	1
430	C	Irr Wat Convey. Pipeline, Nonreinforced	249,748	15	0	1	1	1	1	1	1	1	1	1
388		Irr Field Ditch	249,101	15	0	1	1	1	1	1	1	1	1	1
430	A	Irr Wat Convey. Pipeline, Aluminum Tubi	242,431	20	0	1	1	1	1	1	1	1	1	1
640		Water spreading	111,095	15	0	1	1	1	1	1	1	1	1	1
430	F	Irr Wat Convey. Pipeline, Steel	98,536	25	0	1	1	1	1	1	1	1	1	1
320		Irr Canal or Lateral	75,910	15	0	1	1	1	1	1	1	1	1	1
428	B	Irr Wat Convey. Ditch and Canal Lining2	40,827	20	0	1	1	1	1	1	1	1	1	1
744		Land Grading	32,284	10	0	1	1	1	1	1	1	1	1	1
738		Soil Salinity Control	21,927	5	0	0.4	0.8	1	1	1	0.8	0.4	0.2	1
746		Rice Wat Control	19,987	1	0	1	1	1	0.8	0.6	0.4	0.2	0.1	0
743		Improved Wat Application	12,380	1	0	1	1	1	0.8	0.6	0.4	0.2	0.1	0
		Total Cost Share	118,543,838											
		Average, weighted by Cost Share		18.3	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Air Quality

Table 10 shows the practices assigned to the category of reducing wind erosion and benefiting air quality. These practices historically accounted for 5.8 percent of EQIP cost share funds and had an average total cost of $25.25 per acre, with $8.64 of cost share. In areas that wind erosion is an issue, reduced tillage reduces the concern. To reflect the fact that some reduced tillage practices are applied in areas where wind erosion is not a problem, the proportion of national reduced tillage acres (Crop Residue Management Survey) occurring in the Pacific, Southern and Northern Plains, and Mountain regions (43 percent) was calculated and used as a factor to reduce treated acreage in Table 10. This level of funding has provided treatment to an estimated 2.7 million acres.

Table 11 shows the life and expected benefit stream over time for each practice, and the cost-share weighted averages over the group of practices. The average practice life for the wind erosion control practices was found to be 7.8 years, with nearly full benefits occurring in years three through 6, followed by a gradual taper to 50 percent of benefits in year 10.

The key element in the air quality benefits analysis is the estimate by Ribaudo and others (1989) that the CRP program provided a U.S. average of $25 per acre in NVP of benefits due to improved air quality (the estimates ranged from $0 in the Appalachia, Corn Belt, Delta States, and Lake States, up to $52 in the Mountain states.) It was assumed that where applied, the practices listed in Table 10 provide the same level of benefits to air quality as did the CRP. The $25 per acre value is updated with the data from the consumer price index for the years of 1988 to 2001. During that period the index increased form 118.3 to 177.1 (a 1982-84 average base), for a percent increase of 49.7. Therefore, the per-acre NPV is $37.43. However, to insert this in the worksheet using the same methodology as for the other categories of benefits, the NPV was analyzed assuming a 10-year horizon at a 7.0 percent discount rate, which resulted in $37.43/7.515 or $4.98.

Table 10. Historical EQIP data on practices benefiting air quality

							Implemented Practices (excludes contract units with zero cost share):					
	Practice Definition	Units	Acre[a] divisor	Wind Area[b] Prop.	Approved Cost Share	Cost Share * wind area	Contracts	Units	Acres	cost share	total cost	Total Cost per acre
329A	Res. Man., No-Till and Strip Till	AC	1	0.43	18,826,296	8,095,307	8,892	493,323	493,323	8,034,476	14,953,683	30.31
342	Critical Area Planting1	AC	1	1	6,588,314	6,588,314	4,618	175,419	175,419	2,685,059	25,361,525	144.58
329B	Residue Management, Mulch Till	AC	1	0.43	5,972,819	2,568,312	4,286	377,827	377,827	2,732,861	4,699,092	12.44
550	Range Planting	AC	1	1	5,611,698	5,611,698	1,607	116,180	116,180	1,564,645	2,999,409	25.82
612	Tree/Shrub Establishment	AC	1	1	4,296,547	4,296,547	1,542	890,227	890,227	1,614,216	3,474,921	3.90
380	Windbreak/Shelterbelt Establishment	FT	66	1	4,265,777	4,265,777	1,888	4,267,734	64,663	1,445,988	2,677,947	41.41
340	Cover Crop	AC	1	1	3,777,254	3,777,254	2,791	102,135	102,135	1,345,112	4,889,644	47.87
328	Conservation Crop Rotation	AC	1	1	3,370,572	3,370,572	15,725	218,859	218,859	1,767,221	2,929,007	13.38
705	Air Management	ac.	1	1	1,799,593	1,799,593	378	8,902	8,902	429,597	885,214	99.44
344	Residue Management, Seasonal	AC	1	0.43	1,484,099	638,163	10,526	198,042	198,042	835,521	3,261,113	16.47
650	Windbreak/Shelterbelt Renovation	FT	66	1	736,379	736,379	258	516,084	7,819	244,583	398,367	50.95
327	Conservation Cover1	AC	1	1	640,065	640,065	764	6,026	6,026	177,324	342,513	56.84
329C	Residue Management, Ridge Till	AC	1	0.43	231,111	99,378	221	7,782	7,782	127,302	156,033	20.05
422	Hedgerow Planting	FT	33	1	216,182	216,182	54	98,127	2,974	28,597	563,364	189.46
586	Stripcropping	AC, Field	1	1	200,474	200,474	68	4,426	4,426	82,294	116,475	26.32
392	Field Windbreak	FT	66	1	136,832	136,832	31	77,048	1,167	26,718	36,969	31.67
609	Surface Roughening	AC	1	1	55,281	55,281	878	5,855	5,855	31,928	55,243	9.44
589B	Cross Wind Stripcropping	AC	1	1	38,029	38,029	110	2,940	2,940	15,788	21,635	7.36
342A	Critical Area Planting2	AC	1	1	31,597	31,597	8	13	13	5,169	8,911	712.88
422A	Herbaceous Wind Barriers	FT	66	1	15,202	15,202			0			0.00
704	Agroforestry Planting	ac.	1	1	13,384	13,384	1	40	40	6,620	8,826	220.65
589C	Cross Wind Trap Strips	AC	1	1	10,910	10,910	25	223	223	4,765	6,548	29.36
758	Strip - Intercropping	ac.	1	0.43	9,672	4,159	5	851	851	9,672	9,672	11.37
327A	Conservation Cover2	AC	1	1	8,107	8,107	11	18	18	3,703	5,247	291.50
589A	Cross Wind Ridges	AC	1	1	1,721	1,721	12	2,293	2,293	1,721	2,293	1.00
Total					58,337,915	43,219,237			2,688,003	23,220,880	67,863,651	
Share in total EQIP Cost Share						0.058		Average per acre costs		8.64	25.25	

[a]For wind breaks and other strips in feet, assume 2 per 40 acre square field, so 1320 linear foot protects 20 acres, or 66 feet of windbreak per acre. Hedgerow is along one side of 80 acre field.

[b]The proportion of national conservation tilled acreage occuring in the Mountain, N.Plains, Pacific, and S.Plains where wind erosion is a concern.

Table 11. Distribution of benefits over time for practices benefiting air quality

Practice	Definition	Historical Cost Share	Practice Life	Proportion of Full Annual Benefits Occurring by Year (year 1 is funding and contract year)									
				1	2	3	4	5	6	7	8	9	10
329A	Res. Man., No-Till and Strip Till	8,095,307	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
342	Critical Area Planting1	6,588,314	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
550	Range Planting	5,611,698	10	0.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5
612	Tree/Shrub Establishment	4,296,547	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
380	Windbreak/Shelterbelt Establishment	4,265,777	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
329B	Residue Management, Mulch Till	2,568,312	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
705	Air Management	1,799,593	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
340	Cover Crop	1,624,219	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
328	Conservation Crop Rotation	1,449,346	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
650	Windbreak/Shelterbelt Renovation	736,379	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
344	Residue Management, Seasonal	638,163	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
327	Conservation Cover1	275,228	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
422	Hedgerow Planting	216,182	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
586	Stripcropping	200,474	5	0.0	0.5	1.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2
392	Field Windbreak	136,832	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
329C	Residue Management, Ridge Till	99,378	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
609	Surface Roughening	55,281	1	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
589B	Cross Wind Stripcropping	38,029	5	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
342A	Critical Area Planting2	31,597	15	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
422A	Herbaceous Wind Barriers	15,202	5	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
704	Agroforestry Planting	13,384	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
589C	Cross Wind Trap Strips	10,910	5	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
758	Strip - Intercropping	4,159	5	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
327A	Conservation Cover2	3,486	10	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
589A	Cross Wind Ridges	1,721	5	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0
733	Cross Slope Farming	0	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
Total Cost Share		38,775,518											
Average, weighted by Cost Share			7.8	0.0	0.7	0.8	0.8	0.9	0.8	0.7	0.7	0.6	0.5

Non-Animal Waste Nutrient Management

For improved nutrient management, Appendix Table A1 included only one practice: "590 nutrient management", and treated acres totaled 4.4 million. Analysis of EQIP historical data showed that 72 percent of this practice's acres were for nutrient management not associated with land application of animal waste (i.e., 3.2 million acres). The average cost share for this practice was $2.96 per acre while the total cost was $6.11 per acre. Non-animal waste nutrient management practices accounted for 3 percent of the old program funds and were estimated to account for 1.9 percent of the EQIP funds under the new program. The benefit estimate was based on fertilizer savings as described below.

Since most producers, not using proper nutrient management techniques, tend to over apply fertilizers; on-farm benefits associated with nutrient management are the result of cost savings through the reduction of purchased mineral fertilizer inputs. Improvements in crop yields will normally not occur, since fertilizer usage already exceeds the minimum needed for the expected yield. Benefits associated with the proper utilization of nutrients on farms using commercial mineral fertilizers alone will tend to be smaller than those realized from the farms that apply both animal manure and commercial fertilizers. Since the purchase of mineral fertilizers directly impacts a given producer's bottom line in a manner that is obvious to the producer, they tend to apply mineral fertilizers more in line with soil test recommendations. This is not to say that over application of nutrients does not occur, just that the magnitude of each occurrence is less than that associated with the application of animal wastes.

Available information documenting reductions in nutrient use associated with the adoption of nutrient management practice in accordance with NRCS standards is somewhat limited. Some individual states have interviewed producers to obtain this information, however the sample size is relatively small, and not necessarily geographically distributed. Two sources of information were found which indicate relative reductions in nitrogen and phosphorus applications on lands utilizing nutrient management "practices".

The first is "National Management Measures to Control Nutrient Source Pollution from Agriculture, published by the US Environmental Protection Agency. The report gathered fertilizer input data from farmers located within 8 USDA Demonstration and 8 Hydrologic Unit Projects from 1991-1995. It was not clear how many farms were surveyed in all of the samples. This study indicated that after adoption of nutrient management, farmers reduced nitrogen application by an average of 51 pounds per acre, and phosphorus by 26 pounds. Fertilizer application rates in this study varied across the country. The nitrogen application reduction ranged from a low of 21 pounds to a high of 72 pounds. Phosphorus reduction rates ranged from 6 to 55 pounds.

A second study conducted by the Economic Research Service (ERS) and completed in 1998 surveyed 890 producers in 16 states. The study did not specifically state that the adoption of nutrient management practices was a result of implementation of a plan developed with technical guidance provided in the NRCS nutrient management practice standard. Instead, the study classified producers as low, medium, and high adopters of nutrient management technologies. The factors the study considered in classifying producers in relation to nutrient management activities were:

1) Nitrogen test using either soil or plant tissue in 1995 or 1996,
2) Nitrogen inhibitor used in 1996,
3) No nitrogen products were applied by broadcasting, or if nitrogen was broadcast, the product was incorporated into the soil for the 1996 crop,
4) All nitrogen was applied at or after planting in 1996,
5) Some aspect of precision agriculture was adopted before or during 1996,
6) A legume was grown in rotation with corn sometime during the 2 years prior to 1996, and
7) Either a negative or slightly positive nitrogen mass balance based on expected yield.

Producers in the high category adopted 4 or more of the listed nutrient management attributes. Medium category farmers used 2 or 3 of the components, and low category producers used either one attribute or none at all.

The Natural Resources Conservation Service (NRCS) Nutrient Management Standard (Practice 590) encompasses all of the previously mentioned attributes. However, most of them only apply under certain geographic and environmental situations, and are not universally required on all 590 plans. The only one of the seven attributes which is required by the NRCS nutrient management standard (590) is item 7 regarding nitrogen mass balance based on expected crop yield. This is also the area where most producers do not meet NRCS standards for nutrient management. Frequently, producers will apply extra nitrogen as a form of cheap "insurance" to give crops an extra boost.

For the purposes of this analysis, a weighted average of the medium and high producers was used to approximate the producers who adopt the NRCS nutrient management standard. The relative amounts of nutrients applied to crops, and measurement of the impacts of moving from the base condition (the low adopters in the ERS study) to fully adopting the NRCS nutrient management standard (composite of the medium and high adopters) can be approximated by use of the values in the ERS study).

Average Nutrient Application on Corn by Class of Nutrient Management Adopters

Item	Low Adopters	Medium Adopters	High Adopters
Nitrogen (lbs.)	155	132	120
Phosphorus (lbs.)	58	54	46
Potash (lbs.)	84	69	82
Percent of Total Producers	19	70	12

Developing a composite application rate of those who adopt nutrient management according to NRCS standards (following the assumptions in the previous paragraph) compared to those producers who do not follow NRCS 590 results in the following application rates:

Average Estimated Nutrient Application with Adoption of NRCS 590

Item	Non Adopters	Adopted NRCS 590 Standard	Net Reduction Due to Adoption of NRCS 590
Nitrogen (lbs.)	155	130	25
Phosphorus (lbs.)	58	53	5
Potash (lbs.)	84	71	13

Prices for nutrients applied to cropland can vary based on the form in which the nutrients are applied. Anhydrous ammonia, for example, is less expensive than other forms of nitrogen. Nitrogen is the nutrient that exhibits the greatest price variation between commonly applied forms of the input. For the purposes of this analysis, prices of nutrients are set based on data from the National Agricultural Statistics Service published in April 2002. The prices per unit are derived from the national average cost per ton of various commercial product prices based on the percentage of nutrient contained in a ton. Only mineral fertilizers that were applied as a single nutrient were used to determine nutrient price values. For the purposes of this analysis, nitrogen is valued at $0.149 per pound (based on the national average price for anhydrous ammonia[18]), phosphorus at $0.246 per pound (based on the national average price for super phosphate), and potash at $0.134 per pound (based on the national average price for 0-0-62).

The estimated benefits per acre in cost savings are shown below:

Reduced Corn Fertilizer Input Costs per Acre With Adoption of Nutrient Management According to NRCS Standards

Item	Input Reduction (lbs.)	Price Per Unit of Input ($)	Cost Savings ($)
Nitrogen	25	0.15	3.73
Phosphorus	5	0.25	1.23
Potash	13	0.13	1.74
Total Savings			6.70

Note: other forms of nitrogen range in price from $0.212 per pound for 30 % Nitrogen to $0.231 for 32 % Nitrogen. The lower price used in the analysis will tend to make benefit estimates conservative.

Wildlife Habitat

Table 12 shows that practices benefiting wildlife habitat improvement accounted for 5.5 percent of EQIP cost share funds historically. As in the case of irrigation, a subset of practices whose units could not be converted to acres was assumed to be "associated" with the per-acre practices. Their costs were included in the computations. Table 12 shows that 5.5 percent of EQIP funds were spent on these practices that benefit wildlife. The average cost share was $9.83 per acre while the total cost was $21.58 per acre. Table 13 defines the average life of the practices and the benefit stream over time, similarly to those of the previously discussed benefit categories.

The Environmental Quality Incentives Program is designed to provide multiple levels of beneficiary impacts to the environment through the implementation of conservation practices and systems. As stated in legislation describing EQIP purposes, benefits include positive impacts to wildlife. Generally, the Environmental Quality Incentives Program focuses on erosion and water quality environmental concerns in areas where significant natural resource problems exist. However, these issues have a direct impact on wildlife and the conservation practices often provide important habitat[19]. The program also provides opportunities for direct assistance with wildlife habit management and wetland habitat management. Fish and wildlife benefits accrue based on the types of practices installed with the EQIP. The primary practices are conservation buffer practices, fencing, ponds, upland wildlife habitat management and wetland restoration and management.

A review of available literature indicates that a great deal has been written about the values of wildlife conservation (Heard, et al and Gibilisco, Chuck and Gregory Filipek, Washington Dept. of Fish and Wildlife). The National Survey of Fishing, Hunting and Wildlife Associated Recreation conducted by the U.S. Dept. of the Interior, Fish and Wildlife Service contains extensive data on expenditures relating to the availability of wildlife-based activities.

For the purpose of this analysis, benefits are calculated based on results from an ERS study described in Feather, et al. Benefits are based on *use values*, or the value derived from directly using the resource. Specifically, benefits are calculated for wildlife viewing and pheasant hunting. Although improvements in wildlife habitat benefit a number of avian species, the demand for pheasant hunting was easier to quantify based on existing recreational data. The ERS model evaluates the quantity and quality of the cover available for certain avian species, then estimates the surplus resulting from converting land to CRP. Since establishing grassland or forest cover creates suitable habitat for birds, small game, and large game, hunters and wildlife viewers then benefit from these increased populations (Feather, p. 10) The model also incorporates travel costs, landscape diversity, and population density.

However, there are limitations associated with calculating benefits for EQIP based on the CRP, as summarized in the following matrix:

CRP	EQIP
• Land retired from production	• Land remains in agricultural production
• Minimum contract length of 10 years	• Average contract length based on historical participation is 4-6 years
• Emphasis on marginal land	• Emphasis on productive land with treatment needs

Practices that are beneficial to wildlife, primarily those that improve cover, are listed in Table bc6. Based on the projected number of acres in future program implementation years. Estimate the per-acre benefits for wildlife. The annual benefits for improved wildlife habitat are based on ERS studies of the CRP program and include two components: improved wildlife viewing ($10.02) per acre and improved pheasant hunting ($2.36) per acre. These benefit estimates were reduced 50 percent to account for factors such as: expected lower per-acre benefits on "working" lands versus retired lands, different spatial proximity of EQIP lands than CRP lands, shorter contract length, etc.

[19] Gray, Randall; "EQuiPping Your Partners" Bird Conservation, Issue 11, 1999

Table 12. Historical EQIP practices benefiting wildlife

Practice Code and Name		Units	Approved Number Contracts	Approved Number Units	Approved Cost Share	Implemented[a] Number Contracts	Implemented[a] Number Units	Implemented[a] Cost Share	Total Cost
412	Grassed Waterway	AC	10,743	3,424,746	13,147,345	4597	1,228,041	6,360,695	13,566,131
612	Tree/Shrub Establishment	AC	4,423	1,668,399	4,296,547	1542	890,227	1,614,216	3,474,921
645	Upland Wildlife Habitat Management	AC	59,787	38,615,102	2,444,495	10701	152,516	957,803	2,359,986
666	Forest Stand Improvement	AC	4,841	302,133	2,128,501	759	13,102	544,410	1,197,087
657	Wetland Restoration	AC	457	101,367	1,258,953	126	7,890	460,075	1,594,337
338	Prescribed Burning	AC	3,322	768,820	1,170,328	614	58,873	234,302	359,879
327	Conservation Cover1	AC	3,706	294,805	640,065	764	6,026	177,324	342,513
391	Riparian Forest Buffer1	AC	4,040	203,975	410,637	599	46,155	124,289	191,489
644	Wetland Wildlife Habitat Management	AC	8,340	970,136	364,580	1152	23,941	166,132	321,395
322	Channel Vegetation	AC	210	59,046	233,803	32	5,171	14,912	43,479
Associated Practices:									
580	Streambank and Shoreline Protection	FT	3,057	3,651,616	9,043,292	941	794,267	3,249,540	7,441,466
380	Windbreak/Shelterbelt Establishment	FT	4,776	10,520,008	4,265,777	1888	4,267,734	1,445,988	2,677,947
386	Field Border	FT	3,668	14,668,441	833,822	893	1,020,219	292,900	414,942
650	Windbreak/Shelterbelt Renovation	FT	663	1,633,870	736,379	258	516,084	244,583	398,367
422	Hedgerow Planting	FT	385	749,969	216,182	54	98,127	28,597	563,364
392	Field Windbreak	FT	207	579,940	136,832	31	77,048	26,718	36,969
Totals (Acres Treated sum excludes those with FT units)					41,327,538		1,621,295	15,942,484	34,984,272
Per-acre Costs								9.83	21.58
These practices share of EQIP Cost Share					0.055				
Total EQIP Approved Cost Share					746,132,579				

Acreage total is sum of practice acres divided by 1.50 to reflect that under the EQIP program, most acres would receive at least two of these practices.

[a] Excludes contract units with zero cost share.

Table 13. Distribution of benefits over time for practices benefiting wildlife habitat.

				Proportion of Full Annual Benefits Occurring by Year (year 1 is funding and contract year)									
	Practice Definition	Historical Cost Share	Practice Life	1	2	3	4	5	6	7	8	9	10
412	Grassed Waterway	13,147,345	10	0.0	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
580	Streambank and Shoreline Protection	9,043,292	20	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
612	Tree/Shrub Establishment	4,296,547	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
380	Windbreak/Shelterbelt Establishment	4,265,777	15	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
645	Upland Wildlife Habitat Management	2,444,495	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
666	Forest Stand Improvement	2,128,501	10	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
657	Wetland Restoration	1,258,953	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
338	Prescribed Burning	1,170,328	5	0.0	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.0
386	Field Border	833,822	10	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
650	Windbreak/Shelterbelt Renovation	736,379	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
327	Conservation Cover1	640,065	10	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
391	Riparian Forest Buffer1	410,637	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
644	Wetland Wildlife Habitat Management	364,580	1	0.0	1.0	1.0	1.0	0.8	0.6	0.4	0.2	0.1	0.0
322	Channel Vegetation	233,803	10	0.0	0.1	0.2	0.4	0.8	1.0	1.0	1.0	1.0	1.0
422	Hedgerow Planting	216,182	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
392	Field Windbreak	136,832	15	0.0	0.4	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total		41,327,538											
Average, weighted by Cost Share			12.8	0.0	0.5	0.7	0.8	0.9	1.0	0.9	0.9	0.9	0.9

A number of practices benefit wildlife populations by reducing soil erosion and improving aquatic habitat, however these benefits are already quantified in the water quality section of the analysis. Impacts of many practices that may be managed for wildlife are not included, such as pasture and hay land planting, fencing, or ponds. Other recreational activities are not covered such as nature walking, or big game hunting. In addition, *nonuse values* are not quantified, or values given to the existence of an environmental resource even though it is not currently used, such as existence value bequest value, or option value (Smith, 1996).

The net economic benefit an individual receives from consuming a market good is defined as the excess, over and above the market price, that an individual would pay to consume the good. This net benefit is referred to as "consumer surplus". (Deaton and Muelbauer, 1980) For purposes of this analysis benefits accruing to wildlife purposes are calculated for three specifically defined uses. Although the resulting benefits are high, they are based on actual expenditure or use data for the identified recreational purposes, and the surplus resulting from EQIP. There are significant benefits for other uses that are not quantified, small and large game hunting, for example. Benefits that are more difficult to quantify are also not included. The benefits are non-monetary and include values given to existence of resources not currently used.

Land Treatment Benefit Cost Ratios

Tables 14 and 15 show the estimated benefits and costs for the land treatment benefit categories under the old program and new program scenarios. Note that for the new program relative to the old, the benefits and treated acres do not all expand at the same proportion due to the differing cost share percent across practices for the old program (uniformly 75% for the new program). Also, note that even though per-are total treatment cost is unchanged, the BC ratios relative to total cost decrease since with a higher cost share while the Technical Assistance (TA) percent of EQIP funds remains constant, the TA per unit treated is increased. The major findings are given in the following lists. A more detailed discussion of selected benefit categories follows the lists.

Table 14 shows under continuance of the old program the following is estimated to occur:

- 2.6 million acres would be newly treated for USLE reduction, generating $480 million in total benefits, or $373 million in net benefits over total cost, and BC ratios of 5.6 relative to EQIP funds and 4.5 relative to total costs;
- 7.0 million acres of grazing land would be newly treated, generating $503 million in total benefits, or $232 million in net benefits over total cost, and BC ratios of 2.3 relative to EQIP funds and 1.9 relative to total costs;
- 6.0 million acres of irrigated land would be newly treated, generating $449 million in total benefits, or $248 million in net benefits over total cost, and BC ratios of 2.8 and 2.2 relative to EQIP funds and total costs;
- wind erosion would be reduced on 5.7 million acres, providing total benefits of $115 million, or $42 million in net benefits over total cost, and BC ratios of 2.0 and 1.6 relative to EQIP funds and total costs;
- total fertilizer savings valued at $167 million, or $129 million in net savings over total cost are generated on 8.6 million acres through improved nutrient management, with BC ratios of 5.5 and 4.0 relative to EQIP funds and total costs;
- total wildlife benefits of $135 million, or $65 million in net benefits over total cost, are generated on 4.8 million acres of crop and grazing land, resulting in BC ratios of 2.4 and 1. 9 relative to EQIP funds and total costs; and
- land treatment overall accounted for 60% of EQIP cost share funds, treated 34.5 million acres, and generated $1,850 million in total benefits, or $1.1 billion in net benefits over total cost, for BC ratios of 3.0 relative to EQIP funds and 2.4 relative to total cost.

Table 14. Calculation of Benefit Cost ratios for EQIP funded land treatments, by benefit category for old program

	Benefit Categories[a]						
Fund Year	USLE Reduction	Grazing Productivity	Irrigation Water Savings	Wind Erosion	Non-waste Nutrient	Wildlife Habitat	Selected[c] Totals
Analytical Parameters[b]							
Share of EQIP funds	0.084	0.214	0.159	0.058	0.030	0.055	0.600
Benefit per acre	43.00	15.01	13.68	4.98	6.70	6.19	
Total Cost per acre	85.08	73.65	64.69	25.25	6.11	21.58	
Cost Share per acre	27.81	25.94	22.50	8.64	2.96	9.83	
EQIP Cost Share Funds ($mill.):							
2002	12.4	31.7	23.5	8.6	4.4	8.2	88.8
2003	12.4	31.7	23.5	8.6	4.4	8.2	88.8
2004	12.4	31.7	23.5	8.6	4.4	8.2	88.8
2005	12.4	31.7	23.5	8.6	4.4	8.2	88.8
2006	12.4	31.7	23.5	8.6	4.4	8.2	88.8
2007	12.4	31.7	23.5	8.6	4.4	8.2	88.8
Total	74.7	190.0	141.1	51.4	26.6	49.2	533.0
Acres Treated:							
2002	447,430	1,220,496	1,045,163	992,172	1,500,000	833,664	6,038,925
2003	438,657	1,196,565	1,024,669	972,718	1,470,588	817,318	5,920,515
2004	430,056	1,173,103	1,004,578	953,645	1,441,753	801,292	5,804,426
2005	421,623	1,150,101	984,880	934,946	1,413,484	785,581	5,690,614
2006	413,356	1,127,550	965,569	916,614	1,385,768	770,177	5,579,033
2007	405,251	1,105,441	946,636	898,641	1,358,596	755,075	5,469,640
Total	2,556,372	6,973,254	5,971,495	5,668,735	8,570,189	4,763,107	34,503,153
NPV (to fund year) of benefits:							
2002	98,403,700	103,183,308	92,136,745	23,641,400	34,322,789	27,761,109	379,449,051
2003	96,474,216	101,160,106	90,330,143	23,177,843	33,649,794	27,216,773	372,008,874
2004	94,582,564	99,176,575	88,558,963	22,723,375	32,989,994	26,683,111	364,714,582
2005	92,728,004	97,231,936	86,822,513	22,277,819	32,343,131	26,159,913	357,563,316
2006	90,909,808	95,325,427	85,120,111	21,840,999	31,708,952	25,646,973	350,552,270
2007	89,127,263	93,456,301	83,451,089	21,412,744	31,087,208	25,144,091	343,678,697
NPV (2002) Total Benefits	479,773,430	503,076,711	449,218,499	115,265,132	167,342,919	135,351,031	1,850,027,722
NPV (2002) EQIP Cost	85,763,043	218,217,651	162,061,541	59,073,289	30,601,185	56,498,968	612,215,676
NPV(2002) Total Cost	106,706,377	271,506,402	201,636,970	73,498,986	38,073,994	70,296,016	761,718,745
Net Benefits over EQIP Cost	394,010,388	284,859,060	287,156,958	56,191,843	136,741,734	78,852,063	1,237,812,045
Net Benefits over Total Cost	373,067,053	231,570,309	247,581,529	41,766,146	129,268,925	65,055,015	1,088,308,977
Benefit Cost Ratios:							
For EQIP Funds	5.6	2.3	2.8	2.0	5.5	2.4	3.0
For Total Cost	4.5	1.9	2.2	1.6	4.4	1.9	2.4

[a]Benefits may be added across columns (categories) since some practices provide benefits in several categories, but adding across for costs would result in double counting;

[b]Other key parameters are listed in Table bc1.

[c]This total involves double counting of costs to the extent that treated acres for a given practice are included in more than one benefit category.

Table 15 shows that under the new program the following is estimated to occur:

- 3.4 million acres would be newly treated for USLE reduction, generating $620 million in total benefits, or $300 million in net benefits over total costs, for BC ratios of 2.4 relative to EQIP funds and 1.9 relative to total costs;
- 10.1 million acres of grazing land would be newly treated, generating $700 million in total benefits, or $-114 million in net benefits over total costs, for BC ratios of 1.1 relative to EQIP funds and 0.9 relative to total costs;
- 15.5 million acres of irrigated land would be newly treated, generating $1,132 million in total benefits, or $26 million in net benefits over total cost, and BC ratios of 1.3 and 1.0 relative to EQIP funds and total costs;
- wind erosion would be reduced on 8.0 million acres, providing total benefits of $156 million, or $-64 million net benefits over total cost, and BC ratios of 0.9 and 0.7 relative to EQIP funds and total costs;
- total fertilizer savings valued at $321 million, or net benefits over total cost of $206 million are generated on 17 million acres through improved nutrient management, with BC ratios of 3.5 and 2.8 relative to EQIP funds and total costs;
- total wildlife benefits of $244 million, or net benefits over total cost of $33 million, are generated on 8.9 million acres of crop and grazing land, resulting in BC ratios of 1.4 and 1.2 relative to EQIP funds and total costs; and
- land treatment overall accounted for 38.7% of EQIP cost share funds, treated 63 million acres, and generated a total of $3.2 billion in benefits, or $387 in net benefits over total cost, for BC ratios of 1.4 relative to EQIP funds and 1.1 relative to total cost.

Table 15. Calculation of Benefit Cost ratios for EQIP funded land treatments, by benefit category for new program

	Benefit Categories[a]						
Fund Year	USLE Reduction	Grazing Productivity	Irrigation Water Savings	Wind Erosion	Non-waste Nutrient	Wildlife Habitat	Selected[c] Totals
Analytical Parameters[b]							
Share of EQIP funds	0.054	0.138	0.102	0.037	0.019	0.036	0.387
Benefit per acre	43.00	15.01	13.68	4.98	6.70	6.19	
Total Cost per acre	85.08	73.65	64.69	25.25	6.11	21.58	
EQIP Cost Share Funds ($mill.):							
2002	16.0	40.8	57.5	11.0	5.7	10.6	141.7
2003	28.0	71.4	107.6	19.3	10.0	18.5	254.8
2004	40.1	102.0	145.3	27.6	14.3	26.4	355.6
2005	48.1	122.3	160.4	33.1	17.2	31.7	412.8
2006	48.1	122.3	160.4	33.1	17.2	31.7	412.8
2007	52.1	132.5	168.0	35.9	18.6	34.3	441.4
Total	232.4	591.3	799.1	160.1	82.9	153.1	2018.9
Acres Treated:							
2002	251,167	738,240	1,185,852	583,019	1,247,948	652,400	4,658,627
2003	430,924	1,266,589	2,173,217	1,000,279	2,141,087	1,119,314	8,131,410
2004	603,536	1,773,934	2,877,740	1,400,950	2,998,721	1,567,667	11,222,548
2005	710,042	2,086,981	3,115,418	1,648,177	3,527,907	1,844,314	12,932,839
2006	696,120	2,046,060	3,054,331	1,615,860	3,458,732	1,808,151	12,679,254
2007	739,343	2,173,103	3,135,785	1,716,191	3,673,490	1,920,422	13,358,333
Total	3,431,131	10,084,906	15,542,343	7,964,476	17,047,884	8,912,271	62,983,011
NPV (to fund year) of benefits:							
2002	55,239,496	62,412,396	104,539,277	13,892,143	28,555,362	21,725,002	286,363,677

2003	94,773,646	107,080,091	191,580,867	23,834,559	48,992,043	37,273,289	503,534,494
2004	132,736,198	149,972,116	253,688,323	33,381,735	68,616,307	52,203,485	690,598,165
2005	156,160,234	176,437,783	274,640,942	39,272,629	80,725,067	61,415,865	788,652,521
2006	153,098,268	172,978,219	269,255,826	38,502,578	79,142,223	60,211,632	773,188,746
2007	162,604,370	183,718,697	276,436,363	40,893,261	84,056,282	63,950,263	811,659,236
NPV (2002) Total Benefits	619,955,805	700,457,636	1,131,866,127	155,912,257	320,478,350	243,820,858	3,172,491,032
NPV (2002) EQIP Cost	257,171,161	654,352,796	889,205,006	177,138,612	91,761,462	169,413,448	2,239,042,485
NPV(2002) Total Cost	320,606,714	815,759,819	1,108,542,241	220,832,802	114,395,956	211,202,099	2,791,339,631
Net Benefits over EQIP Cost	362,784,644	46,104,839	242,661,121	-21,226,354	228,716,888	74,407,409	933,448,547
Net Benefits over Total Cost	299,349,091	-115,302,184	23,323,886	-64,920,545	206,082,394	32,618,759	381,151,401
Benefit Cost Ratios:							
For EQIP Funds	2.4	1.1	1.3	0.9	3.5	1.4	1.4
For Total Cost	1.9	0.9	1.0	0.7	2.8	1.2	1.1

[a]Benefits may be added across columns (categories) since some practices provide benefits in several categories, but adding across for costs would result in double counting;

[b]Other key parameters are listed in Table bc1.

[c]This total involves double counting of costs to the extent that treated acres for a given practice are included in more than one benefit category.

Reductions in water-induced erosion produced the largest net benefits of $394 over EQIP costs, and $373 over total cost overall for the old program scenario (Table 14). The net benefits for the new program are estimated to be $363 million relative to EQIP funds and $300 million relative to total costs (Table 15) for USLE reduction. These practices are estimated to receive 8.4 percent of EQIP funds under the old program and 5.4 percent under the new program. These high net benefits are driven primarily by the large erosion reductions found for EQIP practices, 8.6 tons per acre per year. A possible caveat to this analysis is that the estimate of benefit per ton is a national average, while the EQIP treated acres were only a very small proportion of national acreage. However, under the assumption that EQIP funds were used first in the situations where benefits would be largest, perhaps our estimates are low. Also, note that not accounted for in the benefit estimate with the old program scenario are the non-cost share practices that producers often included in their contracts so as to increase their score and chances of being funded. Total benefits for land treatment are discussed in the final summary, in combination with the animal waste treatment benefits. Table 16 illustrates he percent of resources treated historically and in the old and new alternatives.

The relatively small proportions of the resource being treated, except for irrigated land supports the assumption that benefits and costs per unit of treatment can be considered constant for the level of treatment considered. Even with the irrigation water, the reduction in use per-acre is a fraction of average use per acre, so it is unlikely the price of water would be affected.

Table 16. Estimate of land resource units treated according to EQIP benefit category

	Historical EQIP (Implemented as of Q1, 2002)	Previous rules and funding at $200 million per year for 2002-2007	Rules and Funding According to the 2002 Legislation
Cropland, total	348,701,000	348,701,000	348,701,000
Treated for USLE reduction	886,706	2,556,372	3,431,131
% of total	0.25	0.73	0.98
Treated for wind erosion reduction (air quality)	2,688,003	5,668,735	7,964,476
% of total	0.77	1.63	2.28
Treated for Non-waste nutrient management	4,568,111	8,570,189	17,047,884

% of total	1.31	2.46	4.89
Irrigated Land, total	55,058,000	55,058,000	55,058,000
Treated for net irrigation water reduction	2,876,609	5,971,495	15,542,343
% of total	5.22	10.85	28.23
Grazing Land, total	647,677,000	647,677,000	647,677,000
Treated for grazing productivity	2,374,239	6,973,254	10,084,906
% of total	0.37	1.08	1.56
Crop and Grazing land, total	996,378,000	996,378,000	996,378,000
Treated for wildlife habitat improvement	1,621,295	4,763,107	8,912,271
% of total	0.16	0.48	0.89

Animal Waste Treatment

The analysis of animal waste treatment was handled differently in one important aspect than were the other benefit categories. Since there is flexibility at the state level for the allocation decision of funds to different size categories of animal feeding operations (AFOs), it was not possible to know in advance what the mix of size categories would be. Also, the treatment costs differed greatly on a per animal unit (AU) basis across the size categories. Consequently, the analysis was performed separately for each size category, under the assumption that one percent of the EQIP funds would be allocated to that category). However, in order to develop an estimate of the overall benefits of the EQIP program, assumptions were made about the mix of funding across livestock operation size classes for these two main scenarios: for the old program, the 22.5 percent of total EQIP funds used for animal waste treatment were assumed to be split equally across the three smaller size categories; and for the new program, it was assumed that 50% of the EQIP funds would be split equally across all four size categories.

The 2002 EQIP legislation mandates that 60% of EQIP funds will be spent on livestock related issues. It also eliminates the prohibition against funding for large confined feeding operations (CAFOs). At the same time the U.S. Environmental Protection Agency (EPA) is currently proposing revised waste management rules which will reduce the size of animal feeding operations (AFOs) subject to regulation. A joint USDA and EPA policy initiative establishes the objective that all AFOs will implement Comprehensive Nutrient Management Plans (CNMPs). Consequently, it is expected that as much as 50% of total EQIP funds may be devoted to waste management handling for animal feeding operations (AFOs).

In the past, the question of double counting of benefits of EQIP has been raised (Powell and Wilson, 1997), i.e., should the benefits accruing from the EQIP expenditure be attributed to the regulatory requirements or to EQIP, since the management change would have to happen with or without the EQIP assistance. Since this analysis is by AFO size class, the benefits attributable to the EPA CAFO regulations can be separated from the benefits of EQIP.

EPA conducted a benefit assessment of their proposed CAFO regulatory changes (U.S.EPA, 2001). The approach converted monetary benefit estimates to a per-animal unit basis and then applied those per-unit estimates to the number of animal units estimated to be treated with the EQIP funds. Since EQIP program managers have flexibility in administering the program, particularly at the state level, there is a range of possible outcomes as how the funds could be distributed across different size classes of AFOs. To evaluate this flexibility, the BC ratios for each AFO size class were evaluated independently by assuming each size category received 1% of available EQIP funding. The results can be used to evaluate alternative shares of EQIP funding across the various size classes. The estimates of the number of AUs, AFOs, and the cost of treatment for the alternative scenarios are all taken from the USDA Comprehensive Nutrient Management Plan (CNMP) Cost and Capability Assessment.

EPA Estimate of Benefits from CAFO Animal Waste Treatment

EPA proposed eight different alternatives or scenarios for ways that the CAFO related regulations could be changed to reach more of the animal feeding operations whose animal waste is responsible for water quality problems. The set of eight scenarios consisted of four basic scenarios, which are then each repeated for land application of animal waste at the agronomic Nitrogen and Phosphorus standard rates. The baseline assumes that CAFOs include all AFOs with over 1,000 AUs, as well as AFOs with fewer AUs that meet certain requirements, and contains no specification about allowable rates of land application of animal waste. The four basic scenarios are:

- Scenario 1. Baseline scenario plus dry poultry and immature swine, and heifer operations;
- Scenario 2/3. Baseline, plus dry poultry and immature swine and heifer operations, and a set of rules for identifying CAFOs among the AFOs having size between 300 and 1000 AUs;
- Scenario 4a. Baseline, plus dry poultry and immature swine and heifer operations, and lowering threshold for CAFOs to 500 AUs; and
- Scenario 4b. Baseline, plus dry poultry and immature swine and heifer operations, and lowering threshold for CAFOs to 300 AUs.

The EPA study was not a comprehensive estimate of all benefits expected to result from animal waste treatment, but rather an inclusion of the major categories of benefits for which data and methodology was available. The categories of benefits included, and the range of benefits across the EPA alternatives (annual, 1999 dollars) accruing from each category were:

- Improvements in water quality and suitability for recreational activities ($5 to 145 million);
- Reduced incidence of fish kills (up to just over $1 million);
- Improved commercial shell fishing ($2 to 3 million); and
- Reduced contamination of private wells ($70 to 77 million).

Since the definition of animal units and CAFOs differed between the USDA and EPA studies, the first step in this analysis was to compare the differing estimates of number of CAFOs between the EPA and USDA studies, as shown in Table 17. The estimates are very similar for all classes except the class representing operations with less than 300 animal units, which were not addressed in the EPA benefits estimate.

The second step was to make an assumption about how the additional treated AFOs were distributed across the size classes for the alternative EPA scenarios that are shown in Table 18. This assumption was necessary because the EPA report only gave the total number of CAFOs to be regulated. The basic assumption was that in all scenarios, the remainder of the large CAFOs (over 1000 AUs) would all be treated, and that the additional AFOs would come from the 300 to 1000 AU class. The inability to split the 300 to 1000 AU class at the 500 AU threshold doesn't affect the calculations. The third step was to calculate from the EPA data the additional percent of each size class that would be "newly" regulated under each scenario, as shown in Table 18. Note that Table 18 also shows the EPA estimated benefits for their alternative scenarios.

Table 17. Comparison of EPA, CAFO, and USDA study estimates of number of livestock feeding operation

	Number of Operations			
Size Class	EPA	USDA	Number of Animal Units[a] (USDA)	USDA AU per AFO
> 1000	12,850	11,398	22,788,043	1999.3
500 to 1000		15,614	5,584,475	357.7
300 to 500		17,354	4,272,773	246.2
300 to 1000	28,150			
< 300	334,740	212,835	17,115,899	80.4
Total	375,740	257,201	49,761,190	

Source:
Environmental and Economic Benefit Analysis of Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and the Effluent Guidelines for Concentrated Animal Feeding Operations.
U.S. Environmental Protection Agency, Office of Water, EPA-821-R-01-002, January 2001.

Cost and Capability Assessment of Comprehensive Nutrient Management Planning Guidelines. U.S. Dept. Agriculture, Natural Resources Conservation Service, Draft 2002.

[a]Note that both these studies used the official EPA Animal Unit (AU) definitions.

The fourth step was to apply the percent of newly regulated AFOs to the number of AUs by class from the USDA study (EPA did not report the number of AUs), and then divide the EPA benefit estimates by the number of newly regulated AUs to get an estimate of benefits per AU. The USDA study found that in a given year, the acreage receiving manure at the N-agronomic standard was approximately equal to that receiving manure at the P-agronomic standard. Consequently, the simple average of the N-standard and P-standard estimates were calculated. For purposes of this assessment, the benefit estimate from "Scenario 2/3" was chosen since the treatments being applied in that scenario seemed to be similar to what would happen with EQIP. This resulted in a per-AU benefit estimate of $30.23 per year.

Table 18. Calculation of benefits per animal unit from the EPA proprosed CAFO rule study

		Regulated CAFO Operations[a]:				
	All AFOs	Baseline	Scenario 1	Scenario 2/3	Scenario 4a	Scenario 4b
CAFO Size Class:						
Total	375,740	12,410	17,700	33,500	28,980	45,140
> 1000 AU	12,850	12,410	12,850	12,850	12,850	12,850
300 to 1000 AU	28,150	0	4,850	8,240	3,720	19,980
< 300 AU	334,740	0	0	0	0	0
Benefits ($million, annualized)[b]:						
N-Standard			47.2	48.9	50.7	52.7
P-Standard			132.7	172.7	155.3	192.2
Additional Percent of all AFOs Regulated:						
> 1000 AU			3.42	3.42	3.42	3.42
300 to 1000 AU			17.23	29.27	13.21	70.62
AUs regulated (EPA percent multiplied by USDA estimate of AUs in class):						
> 1000 AU			780,291	780,291	780,291	780,291
300 to 1000 AU			1,698,318	2,885,390	1,302,627	6,961,353
Total			2,478,609	3,665,681	2,082,918	7,741,644
Benefits ($/AU/year):	N-standard		19.04	13.34	24.34	6.81
	P-standard		53.54	47.11	74.56	24.81
	Simple Average[c]		36.29	30.23	49.45	15.81

[a]The EPA study gave only the total number of CAFOs; we made the assumption about distribution by class.

[b]We calculated the simple average of range endpoints given in EPA study.

[c]The USDA Cost and Capability Assessment indicates that in each year, of the acreage receiving manure, approximately equal proportions will receive it at the N and P standards.

Determination of Animal Waste Treatment Costs by AFO Size Class.

Our estimates of the number of AFOs in each size class, the number of animal units per AFO, and of the average treatment costs for these AFOs are all taken from the USDA CNMP Cost and Capability Assessment Study (CCAS). The CCAS utilized a farm-level micro model based on the Census of Agriculture to estimate the joint distribution of livestock production and land available for waste application. The model also included routines for estimating the cost of the more commonly used animal waste treatment practices for each farm. Although many new technologies may have a varying effect on potential treatment costs, it takes time for the majority of farmers to be willing to implement technologies they are unfamiliar with. Therefore, using traditional treatment practices for these analysis most likely results in conservative cost estimates. The analysis included provision for off-farm distribution of animal waste within the same county, provided that other farms had land available for waste application.

The EQIP program provides up to 75 percent cost sharing for CNMP costs under the new EQIP program. It also limits the amount of financial assistance at $450,000 per operation over the life of the farm bill (6 years). The CCAS employed a micro modeling technique to evaluate each individual farm and then aggregate the results upwards. Consequently, animal waste production, land application opportunities, and associated costs were all evaluated on a farm-by-farm basis. The limit on funding was found to impact a significant number of operations. The main findings (Tables 19 & 20) include:

- Of the 257,201 Animal Feeding Operations (AFOs), about 1 percent—2,993 farms—are expected to have CNMP costs eligible for EQIP funding of $450,000 or more in the absence of the payment cap. 64 percent of these farms are CAFOs under present regulations (more than 1,000 EPA animal units).

- Of the 11,398 CAFO farms, about 17 percent are expected to have CNMP costs eligible for EQIP funding of $450,000 or more in the absence of the payment cap.

- This 1 percent of farms accounts for 30 percent of the animal units on all AFOs.

- The largest share of these farms is in the West (Pacific states and Mountain states), where 12 percent of AFOs are expected to have CNMP costs eligible for EQIP funding above the $450,000 cap.

- Almost 6 percent of fattened cattle AFOs are expected to have CNMP costs eligible for EQIP funding above the $450,000 cap, followed by 5 percent of turkey AFOs, 2.3 percent of layer-pullet AFOs, and 2 percent of swine AFOs (Table 20). About 70 percent of fattened cattle animal units are produced on AFOs that are expected to have CNMP costs eligible for EQIP funding above the $450,000 cap.

- Expected CNMP costs per farm for these 2,993 farms averages $138,000 per year per farm over a 10-year period. Under EQIP rules, 75 percent of this amount would be eligible for cost sharing, averaging about $100,000 per year per farm. With the $450,000 cap, these farms would still receive about half of the cost share funds they would have received had there not been a cap, on average.

Historically, 22.5% of EQIP funds were utilized for animal waste treatment practices.

Table 19 presents the finding of the analysis of farm level animal waste treatment costs. Note the following important facts:

- There are 11,398 AFOs in the largest class compared to 212,835 in the smallest class;
- The average sizes seem to be outside of the class size range definitions, but that is due to the mix of EPA and USDA animal unit definitions;
- The per-animal unit costs for the smallest farm size ($43.01) are more than double those of the largest class ($20.44)
- The technical assistance (TA) costs are also much smaller per- animal unit for the largest size of operations than for the smallest.
- The TA estimate shown in Table 19 is from the CCAS team, and is independent of the TA share of EQIP assumption used in this assessment.

Table 20 summarizes the characteristics of the farms where the fund limitation will play a role. The results differ across regions of the U.S., showing that the regions with the largest number of AFOs where the funding limit occurs are the Mountain States (2.3 percent exceeding) and the Southern Plains (1.9 percent exceeding). The Delta, Lake States, and Corn Belt have the smallest percents exceeding (0.8, 0.2, and 0.4 percent). Additional analysis of the effect of alternative funding cap levels is given in a later section of the paper.

Table 19. Derivation of animal waste treatment cost by animal feeding operation (AFO) size class

	Size Classes (No. AUs per operation):				
	>1000	500-1000	300-500	<300	Total
Number of AFOs:					
No funding cap farms	9,472	15,155	17,083	212,498	254,208
Funding cap farms	1,926	459	271	337	2,993
All	11,398	15,614	17,354	212,835	257,201
					0
Total Animal Units	22,805,451	5,598,295	4,288,797	21,200,208	53,892,751
Average Size	2000.8	358.5	247.1	99.6	
Total CNMP costs, annualized over 10 year cost recovery period					
no cap farms	196,738,793	168,328,297	156,957,371	881,652,778	1,403,677,239
cap farms	269,340,827	53,555,680	30,972,343	30,172,165	384,041,015
all	466,079,620	221,883,977	187,929,714	911,824,943	1,787,718,254
Per AFO:					
no cap farms	20,771	11,107	9,188	4,149	45,215
cap farms	139,845	116,679	114,289	89,532	460,344
all	40,891	14,211	10,829	4,284	70,215
Per AU (all farms):	20.44	39.63	43.82	43.01	
EQIP eligible cost (75% of CNMP cost for no cap farms, 450,000 per farm for cap farms)					
no cap farms	147,554,095	126,246,223	117,718,028	661,239,584	1,052,757,929
cap farms	115,325,777	27,484,181	16,227,043	20,179,017	179,216,018
all	262,879,872	153,730,403	133,945,072	681,418,601	1,231,973,948
Per AFO:	23,064	9,846	7,718	3,202	
EQIP eligible cost (old rules, 75% cost share, $50,000 cap):					
average farm, annualized 10 year, 7.0%	0	6,653	6,653	3,213	
EQIP eligible CNMP costs for capped farms, assuming no cap (75% of CNMP cost)	2,324,978,616	110,226,597	21,074,825	12,500,660	2,468,780,698
CNMP cost NOT covered because of cap for capped farms	2,209,652,839	82,742,416	4,847,781	-7,678,357	2,289,564,680
TA hours per AFO	154	128	146	110	

Source: Review Draft NRCS CNMP Cost and Capability Assessment, August 8, 2002.

Table 20. Definition of livestock operations having EQIP eligible CNMP costs large enough that the funding cap of $450,000 is limiting

	Number of farms	Percent of AFOs	Percent of animal units
By farm size:			
>1000 EPA animal units	1,926	16.9%	61.8%
500-1000 EPA animal units	459	2.9%	5.6%
300-500 EPA animal units	271	1.6%	2.5%
<300 EPA animal units	337	0.2%	0.5%
By USDA Farm Production Region:			
Appalachian states	538	2.3%	18.7%
Corn belt states	252	0.4%	8.9%
Delta states	96	0.8%	6.0%
Lake states	111	0.2%	6.3%
Mountain states	184	2.3%	47.1%
Northeast	357	1.1%	8.2%
Northern plains	319	1.2%	44.6%
Pacific states	761	9.5%	40.8%
Southeast	172	1.3%	10.3%
Southern plains	203	1.9%	60.1%
By Dominant Livestock Type:			
Fattened cattle	578	5.7%	70.8%
Milk cows	1265	1.6%	13.4%
Swine	629	1.9%	20.8%
Turkeys	221	6.9%	29.0%
Broilers	62	0.4%	3.6%
Layers/pullets	188	3.5%	20.0%
Confined heifers/veal	45	1.1%	18.4%
Small farms with confined livestock types	5	0.0%	6.0%
All farms	2,993	0.9%	27.2%

Effect of Practice Cost limitation on Animal Waste Treatment Costs

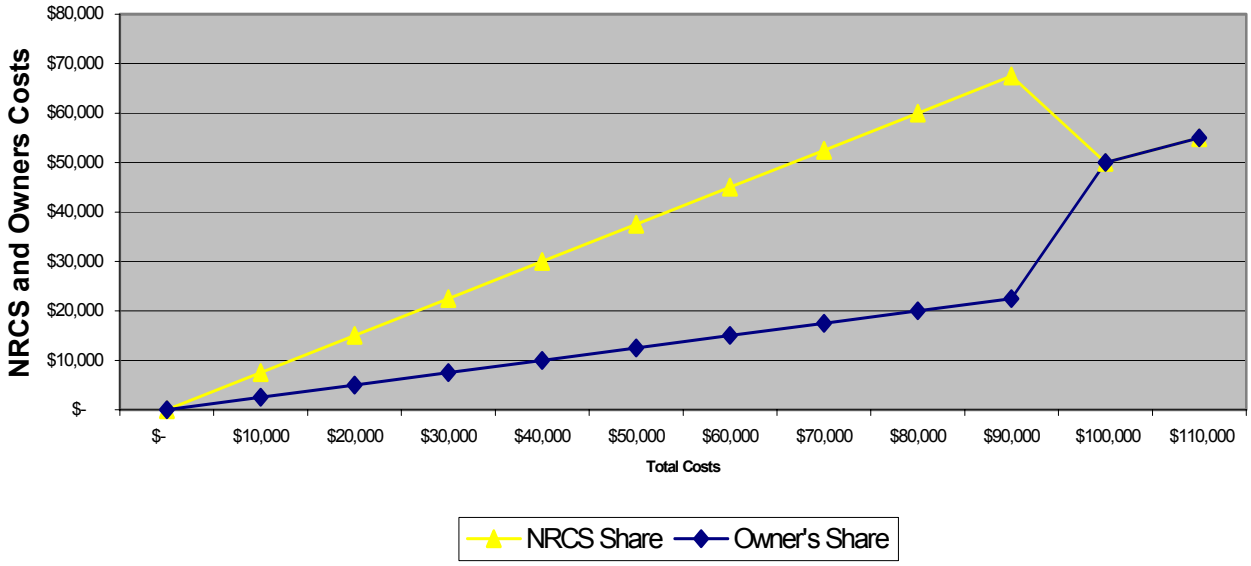
As part of the NOFA, additional guidance was provided through NRCS Chief Bruce Knight: As of July 31, 2002, and for FY2002 contracts only, any "single practice" that has a total cost exceeding $100,000 will be cost-shared at no more than 50 percent.

This guidance raises several issues: an unconditional reduction of cost share once reaching the $100,000 cost share bracket provides great incentive for abusing the system; middle sized producers would bear a greater burden when capped by a practice cost share limitation; and ultimately the practice cost limitation potentially effects only 1.5% of the nation's Animal Feeding Operations.

While a practice costing $99,000 could obtain $74,500 of federal cost share; a practice costing $101,000 would only obtain $50,000 of cost share. Therefore it costs the producer and additional $12,500 for a cost estimate of $101,000. The effect would be a greater likelihood that contractors will be requested to either under-report, or otherwise misrepresent the true costs. In addition, it may be possible to reclassify certain practice components as part of another practice that doesn't reach the cost limitation, thereby allowing producers to still obtain the higher cost share rate. The following graph illustrates the issue at the $100,000 value. At the $100,000 threshold, an inordinate burden

of cost is shifted to the producer. Therefore, an absolute dip in cost share encourages negative incentives for both producers and contractors.

NRCS and Owner's Cost Shares for EQIP Practices under the NOFA



Another issue raised is the fact that the federal cost savings is realized at the expense of the middle size producers. The small producers are receiving the 75% cost share. The large producers will most likely have a greater number of practices and max out their $450,000 contract limit irrespective of a single practice limitation. Therefore the burden of achieving these federal cost reductions is primarily falling on the middle-size program participants.

In addition, only a small proportion of the AFOs (1.5%) are potentially affected, therefore the premise that restricting cost share on a single practice has little effect on spreading conservation dollars farther.

Treatments and Benefits by AFO Size Class for each 1% Share of EQIP Funds

Tables 21 and 22 show the treatment that would be possible with the old and new programs in each AFO size class if it were to receive 1% of the total EQIP funds. Each state will have flexibility in allocating the EQIP funds across the size categories and this 1% approach allows individual BC ratios to be calculated for each class. Additionally, this approach will allow the exploration of how different allocations across the classes affect the total treatment possible. Note that the specification for the "old" scenario is not strictly consistent with the "new" scenario for accounting for the funding cap. Since alternative estimates could not be obtained from the CCAS, the approach for the two middle size classes was to calculate what the annualized cost would be that would add up to the old program's $50,000 funding limit (which was less than 50 percent of the total cost of the systems). For the smallest class, 50% of the total cost was used as the cost share amount.

Larger farms are more likely to face additional cost for off-farm transport of animal waste. However, even with those large off-farm transport costs, larger farms had much lower waste treatment costs on a per-AU basis that did smaller farms.

For analysis purposes it was assumed that in the year that funds are made available, they are also expended. The stream of benefits is assumed to start in that initial year and continue for a 10-year period. The costs are capitalized over a 10-year period. With these assumptions, the costs and benefits are converted to a NPV based on year of funding allocation. A second step then calculates the NPV of costs and benefits of the 6-year program, based on 2002. Tables 21 and 22 show these calculations.

Table 21. AFOs treated and Benefit Cost ratios for a 1% share of EQIP funding per size class, old program continuing

	AFO Size Classes (number of AUs)			
	500-1000	300-500	<300	Total[a]
AFOs newly treated first year	30	30	61	120
Total AFOs treated over 6 year program	169	178	368	714
Percent of total AFOs treated	1.1	1.0	0.2	0.3
AUs newly treated each year	10,613	7,315	6,105	24,033
Total AUs treated over 6 year program	63,677	43,891	36,630	144,199
Percent of AUs treated over 6 year program	1.1	1.0	0.2	0.3
NPV of 10 year benefit stream for each program year:	3,719,128	2,563,512	2,139,412	8,422,053
NPV of 6 year program benefits discounted to 2002:	18,968,288	13,074,420	10,911,426	42,954,133
NPV of Costs (for each class since based on 1% of EQIP):				
EQIP Funds	9,779,303	9,779,303	9,779,303	29,337,908
Total Costs, including TA	18,719,924	14,967,421	12,534,498	46,221,843
Net Benefits over EQIP Funds	9,188,985	3,295,117	1,132,123	13,616,226
Net Benefits over Total Costs	248,363	-1,893,002	-1,623,072	-3,267,710
Benefit Cost Ratio relative to EQIP Funds[a]	1.9	1.3	1.1	1.5
Benefit Cost Ratio relative total cost[a]	1.0	0.7	0.6	0.9

Parameters:

Water quality benefits per AU ($30.23) and nutrient value for crops ($16.40) 46.63

[a]Benefits, Costs, and Benefit Cost ratios for "Total" column are based on 3% of EQIP funds, 1% for each of 3 classes.

Table 21 shows that under the old program, a one percent of the EQIP funding to each of the size classes would have the following effects:

- for the “500-1000” class, 1.1% of the AFOs and AUs would be treated, generating benefits of $19 million, and net benefits of $9.2 million and $248 thousand for EQIP funds and total costs;
- for the “300-500” class, 1.0% of the AFOs and AUs would be treated, generating benefits of $13 million, and net benefits of $3.3 million and -1.9 million for EQIP funds and total costs;
- for the “<300” class, 0.2% of the AFOs and AUs would be treated, generating benefits of $11 million, and net benefits of $1.1 million and $-1.6 million for EQIP funds and total costs; and

- for the all classes together, with allocation of one percent of EQIP funding to each size class, 0.3% of the AFOs and AUs would be treated (with 3% of total EQIP funding), generating benefits of $43 million, and net benefits of $13.6 million and $-3.2 million for EQIP funds and total costs.

Table 22. Animal Feeding Operations (AFOs) treated and Benefit Cost ratios for a 1% share of EQIP funding per class, new program

	Size Classes (No. AUs per operation):				
	>1000	500-1000	300-500	<300	Total[a]
AFOs newly treated each year of program:					
2002	17.1	40.0	51.0	123.0	231
2003	29.3	68.6	87.6	211.1	397
2004	41.0	96.1	122.6	295.6	555
2005	48.3	113.1	144.3	347.8	653
2006	47.3	110.9	141.4	341.0	641
2007	50.3	117.8	150.2	362.1	680
Total	233.3	546.5	697.1	1680.6	3157.4
Percent of total AFOs treated by class	2.0	3.5	4.0	0.8	1.2
Total Animal Units (AUs)Treated	466,772	195,938	172,279	167,398	1,002,387
Percent of AUs treated by class	2.0	3.5	4.0	0.8	1.9
NPV of 10 year stream of benefits for each years funds:					
2002	11,973,978	5,026,355	4,419,426	4,294,210	25,713,969
2003	20,543,590	8,623,648	7,582,349	7,367,517	44,117,103
2004	28,772,535	12,077,938	10,619,536	10,318,651	61,788,660
2005	33,850,041	14,209,339	12,493,572	12,139,590	72,692,541
2006	33,186,315	13,930,725	12,248,600	11,901,558	71,267,197
2007	35,246,903	14,795,704	13,009,134	12,640,544	75,692,285
NPV of 6 year program benefits discounted to 2002:					
	134,384,592	56,411,047	49,599,454	48,194,146	288,589,239
NPV of 1% of EQIP funds including TA:	45,055,231	45,055,231	45,055,231	45,055,231	180,220,922
NPV of total costs including TA:	74,148,485	61,741,350	60,224,685	57,781,670	253,896,189
Net Benefits over EQIP Funds	89,329,362	11,355,816	4,544,224	3,138,915	108,368,317
Net Benefits over Total Costs	60,236,107	-5,330,303	-10,625,231	-9,587,525	34,693,049
Benefit Cost Ratio relative to EQIP Funds[a]	3.0	1.3	1.1	1.1	1.6
Benefit Cost Ratio relative to total cost[a]	2.2	0.9	0.8	0.8	1.1

Parameters:

Sum of water quality benefits per AU ($30.23) and nutrient value for crops ($16.40)	46.63
Average cost share under new rules	0.75

[a]Benefits, Costs, and Benefit Cost ratios for "Total" column are based on 4% of EQIP funds, 1% for each of 4 classes.

Table 22 shows that under the old program, a one percent of the EQIP funding to each of the size classes would have the following effects:

- for the ">1000" class, 2.0% of the AFOs and AUs would be treated, generating benefits of $135 million, and net benefits of $89.3 million and $60.2 million for EQIP funds and total costs;
- for the "500-1000" class, 3.5% of the AFOs and AUs would be treated, generating benefits of $57 million, and net benefits of $11.3 million and $-5.3 million for EQIP funds and total costs;
- for the "300-500" class, 4.0% of the AFOs and AUs would be treated, generating benefits of $50 million, and net benefits of $4.5 million and $-10.6 million for EQIP funds and total costs;
- for the "<300" class, 0.8% of the AFOs and AUs would be treated, generating benefits of $48 million, and net benefits of $3.1 million and $-9.6 million for EQIP funds and total costs; and
- for the all classes together, with allocation of one percent of EQIP funding to each size class, 1.2% of the AFOs and 1.9% of AUs would be treated (with 4% of total EQIP funding), generating benefits of $289 million, and net benefits of $108.2 million and $34.7 million for EQIP funds and total costs.

Sensitivity of Estimates to Key Parameter Changes

The sensitivity of total benefits' estimates to changes in key parameter assumptions was estimated with the results shown in Table 23 through Table 26. First in Table 23, the effects of plus and minus changes of 20 percent in the proportion of EQIP funds allocated to livestock waste, the discount rate, the cost share, and the proportion of funds allocated to technical assistance (TA) were estimated. Then the effects of simultaneously implementing all the plus changes and then all the negative changes were estimated. Next, the effect of assuming that producers would continue to include land treatment practices at zero cost share, with the resulting benefits counted towards the EQIP program, was estimated. Finally in Table 24, the change in benefits resulting from a plus or minus change of 30 percent in the per-unit (acre or AU) benefit estimates was estimated.

Table25 presents percent change effects and Table 26 gives the absolute changes. Only the percent changes are discussed here.

Effects of changing the various parameters are:

- Historically 22.5% of total EQIP funds were allocated to livestock waste. Increasing that to 70% results in 15.5 % less benefits compared to the 50% assumption in the original analysis. Reducing the share to livestock waste to 30% results in a 15.6 percent increase in benefits.
- Increasing the discount rate from 7 to 8.4 percent reduces benefits by 6.6 percent while reducing the discount rate to 5.6 percent increases the benefits by 7.3 percent; reducing the discount rate to 3.1 percent, as recommended in some OMB guidance, increases benefits by 22.5 percent.
- Increasing the average cost share to 90 percent reduces benefits by 14.6 percent, while reducing cost share to 60 percent increases benefits by 21.0 percent.
- Increasing to 31.2 percent (or decreasing to 20.8 percent) the proportion of EQIP funds allocated to TA reduces (increases) benefits by 6.5 percent.
- Simultaneously allocating more to livestock, increasing TA, cost share and the discount rate results in a 25.3 percent decrease in benefits.
- Simultaneously allocating less to livestock, decreasing TA, cost share, and the discount rate results in 38.4 percent increase in benefits.
- Assuming that (or allowing) producers to continue to include non-cost shared practices in their offers so as to increase the chance of being accepted, and then counting the benefits on those treated acres for EQIP, increases benefits by 74.7 percent.
- The percent changes in "Net Benefits Above EQIP Funds" and especially in "Net Benefits Above Total Cost" are large because the original estimates are very small relative to costs. Consequently, moderate changes in benefits constitute large changes in benefits above costs.

Table 23. Sensitivity of total benefit estimate for "new program" to changes in key parameters (plus and minus 20%)

	TA %	Cost Share %	Discount Rate	New share as prop. of old share for land treatment categories	Acres Treated (1000s)	AUs Treated (1000s)	Benefits (millions)	EQIP funds	Total Cost (millions)	Net Benefits above EQIP funds	Net Benefits above Total Cost	B C ratios EQIP	B C ratios Total Cost
Original Settings	26	75	7	0.644	62,983	12,530	6,780	4,480	6,600	2,300	180	1.5	1.1
Variations:													
More to livestock waste (70%)				0.39	40,909	12,530	5,731	4,480	6,600	1,252	-869	1.3	0.7
Less to livestock waste (30%)				0.90	85,232	12,530	7,837	4,480	6,600	3,357	1,236	1.7	1.4
Larger discount			8.4		62,983	13,002	6,331	4,324	6,357	2,007	-25	1.5	1.0
Smaller discount			5.6		62,983	12,052	7,276	4,646	6,858	2,631	419	1.6	1.1
lowest discount rate (OMB 5-year)			3.1		62,983	11,187	8,304	4,968	7,355	3,336	948	1.7	1.3
Larger cost share		90			52,486	10,933	5,791	4,480	5,588	1,312	204	1.3	1.1
Smaller cost share		60			78,729	14,712	8,201	4,480	8,046	3,721	156	1.8	1.0
More TA	31.2				59,050	11,649	6,340	4,480	6,426	1,860	-86	1.4	1.0
Less TA	20.8				66,916	13,410	7,220	4,480	6,778	2,740	442	1.6	1.1
More livestock waste, larger discount, larger cost share, more TA	31.2	90	8.4	0.39	32,106	10,562	4,319	4,324	5,294	-5	-976	1.0	0.6
Less livestock waste, smaller discount, smaller cost share, less TA	20.8	60	5.6	0.9	113,410	15,170	10,934	4,646	8,677	6,289	2,258	2.4	1.5
Producers continue to include non-cost shared land treatment practices (** not related to above variation, benefits counted for EQIP)					160,000	12,530	11,843	4,480	6,600	7,363	5,242	2.6	2.6

Table 24. Sensitivity of total benefit estimate for "new program" to changes in unit benefit parameters (plus and minus 30%)

	Benefits ($/acre)							Million Dollars					Net Benefits (Million $)		B C ratios	
	USLE Reductions	Grazing Productivity	Water Savings	Wind erosion	Non-waste nutrient	Wildlife Habitat	Livestock-related benefits ($/AU)	Benefits	EQIP funds	Total Cost	above EQIP funds	above Total Cost	EQIP	Total Cost
Original Settings	43.0	15.0	13.7	5.0	6.7	6.2	46.6	6,780	4,480	6,600	2,300	180	1.5	1.1
Variations:														
Higher USLE benefits (+30%)	55.9							6,966	4,480	6,600	2,486	366	1.6	1.1
Lower USLE benefits (-30%)	30.1							6,594	4,480	6,600	2,114	-6	1.5	1.0
Higher grazing benefits (+30%)		19.5						6,990	4,480	6,600	2,510	390	1.6	1.1
Lower grazing benefits (-30%)		10.5						6,570	4,480	6,600	2,090	-30	1.5	1.0
Higher H2O savings benefits (+30%)			17.8					7,119	4,480	6,600	2,639	519	1.6	1.2
Lower H2O savings benefits (-30%)			9.6					6,440	4,480	6,600	1,960	-160	1.4	1.0
Higher wind erosion benefits (+30%)				6.5				6,827	4,480	6,600	2,347	226	1.5	1.1
Lower wind erosion benefits (-30%)				3.5				6,733	4,480	6,600	2,253	132	1.5	1.0
Higher non-waste nutrient benefits (+30%)					8.7			6,876	4,480	6,600	2,396	276	1.5	1.1
Lower non-waste nutrient benefits (-30%)					4.7			6,684	4,480	6,600	2,204	84	1.5	1.0
Higher wildlife benefits (+30%)						8.0		6,853	4,480	6,600	2,373	253	1.5	1.1
Lower wildlife benefits (-30%)						4.3		6,707	4,480	6,600	2,227	107	1.5	1.0
Higher livestock-related benefits (+30%)							60.6	7,862	4,480	6,600	3,382	1,262	1.8	1.4
Lower livestock-related benefits (-30%)							32.6	5,698	4,480	6,600	1,218	-903	1.3	0.7
best-case scenario (more benefits)	55.9	19.5	17.8	6.5	8.7	8.0	60.6	8,814	4,480	6,600	4,334	2,214	2.0	1.7
worst-case scenario	30.1	10.5	9.6	3.5	4.7	4.3	32.6	4,746	4,480	6,600	266	-1,854	1.1	0.4

Table 25. Sensitivity analysis, percent changes from original

	Acres Treated (1000s)	AUs Treated (1000s)	Benefits (millions)	Total Cost (millions)	Net Benefits above EQIP funds	Net Benefits above total cost
Original Settings	62,983	12,530	6,780	6,600	2,300	180
Variations:			Percent Changes			
More to livestock waste (70%)	-35.0	0.0	-15.5	0.0	-45.6	-583.6
Less to livestock waste (30%)	35.3	0.0	15.6	0.0	45.9	588.2
Larger discount	0.0	3.8	-6.6	-3.7	-12.7	-114.1
Smaller discount	0.0	-3.8	7.3	3.9	14.4	133.1
Smallest discount	0.0	-10.7	22.5	11.4	45.1	428.0
Larger cost share	-16.7	-12.7	-14.6	-15.3	-43.0	13.4
Smaller cost share	25.0	17.4	21.0	21.9	61.8	-13.4
More TA	-6.2	-7.0	-6.5	-2.6	-19.1	-147.8
Less TA	6.2	7.0	6.5	2.7	19.1	145.9
More livestock waste, larger discount, larger cost share, more TA	-49.0	-15.7	-36.3	-19.8	-100.2	-643.2
Less livestock waste, smaller discount, smaller cost share, less TA	80.1	21.1	61.3	31.5	173.4	1,156.8
Non-cost shared practices included	154.0	0.0	74.7	0.0	220.1	2,818.1
Higher USLE benefits (+30%)			2.7		8.1	103.5
Lower USLE benefits (-30%)			-2.7		-8.1	-103.5
Higher grazing benefits (+30%)			3.1		9.1	117.0
Lower grazing benefits (-30%)			-3.1		-9.1	-117.0
Higher H2O savings benefits (+30%)			5.0		14.8	189.0
Lower H2O savings benefits (-30%)			-5.0		-14.8	-189.0
Higher wind erosion benefits (+30%)			0.7		2.0	26.0
Lower wind erosion benefits (-30%)			-0.7		-2.1	-26.3
Higher non-waste nutrient benefits (+30%)			1.4		4.2	53.5
Lower non-waste nutrient benefits (-30%)			-1.4		-4.2	-53.5
Higher wildlife benefits (+30%)			1.1		3.2	40.7
Lower wildlife benefits (-30%)			-1.1		-3.2	-40.7

Higher livestock-related benefits (+30%)	16.0	47.1	602.4
Lower livestock-related benefits (-30%)	-16.0	-47.1	-602.4
best-case scenario (more benefits)	30.0	88.4	1132.2
worst-case scenario (less benefits)	-30.0	-88.4	-1132.2

Table 26. Absolute changes for sensitivity analysis ($million)

	Acres Treated (1000s)	AUs Treated (1000s)	Benefits (million $)	Total Cost (million $)	Net Benefits above EQIP funds	Net Benefits above total cost
Original Settings	62,983	12,529	6,780	6,862	2,060	-82
Variations:			Absolute Changes			
More to livestock waste (70%)	-22,074	1	-1,049	-262	-808	-787
Less to livestock waste (30%)	22,249	1	1,057	-262	1,297	1,318
Larger discount	0	473	-449	-505	-53	57
Smaller discount	0	-477	496	-4	571	501
Larger cost share	-10,497	-1,596	-989	-1,274	-748	286
Smaller cost share	15,746	2,183	1,421	1,184	1,661	238
More TA	-3,933	-880	-440	-436	-200	-4
Less TA	3,933	881	440	-84	680	524
More livestock waste, larger discount, larger cost share, more TA	-30,877	-1,967	-2,461	-1,568	-2,065	-894
Less livestock waste, smaller discount, smaller cost share, less TA	50,427	2,641	4,154	1,815	4,229	2,340
Non-cost share practices included	97,017	1	5,063	-262	5,303	5,324
[a]Benefit Variations:						
Higher USLE benefits (+30%)			186			
Lower USLE benefits (-30%)			-186			
Higher grazing benefits (+30%)			210			
Lower grazing benefits (-30%)			-210			
Higher H2O savings benefits (+30%)			340			
Lower H2O savings benefits (-30%)			-340			
Higher wind erosion benefits (+30%)			47			
Lower wind erosion benefits (-30%)			-47			

Higher non-waste nutrient benefits (+30%)	96
Lower non-waste nutrient benefits (-30%)	-96
Higher wildlife benefits (+30%)	73
Lower wildlife benefits (-30%)	-73
Higher livestock-related benefits (+30%)	1,082
Lower livestock-related benefits (-30%)	-1,082
best-case scenario (more benefits)	2,034
worst-case scenario (less benefits)	-2,034

[a]Values for the Net Benefit changes are the same as for the Total Benefits change.

Note that changing the discount rate changes the number of animal units treated, but not the number of acres treated. That is because the original costs for AFO treatment were "annualized" and so the discount factor is used to calculate the NPV of that stream of costs. No such consideration is included for land treatment costs.

Changes in the per-unit benefit estimates either up or down by 30 percent result in the following changes in the same direction (same magnitude both ways) in total benefits:

- a 2.7 percent change due to USLE benefit changes;
- a 3.1 percent change due to grazing benefit changes;
- a 5.0 percent change due to irrigation water savings changes;
- a 0.7 percent change due to wind erosion changes;
- a 1.4 percent change due to non-waste nutrient management changes;
- a 1.1 percent change due to wildlife benefit changes;
- a 16.0 percent change due to livestock waste changes; and
- changes of 30 percent when either all per-unit benefits are increased or decreased 30 percent.

EQIP Technical Assistance Costs

In an attempt to accurately determine the technical assistance necessary to implement Farm Bill programs, NRCS asked and answered the following questions.

- Who within the Agency generally carries out farm bill program activities?
- What tasks are involved in carrying out farm bill program activities?
- What measures or practices are typically installed for each program?
- How long does it take to carry out the necessary tasks, from planning to implementation?
- How many program participants are there on average?
- What are the average contract lengths for the programs?
- What is the average contract size?
- What is the dollar cost of the time spent carrying out the farm bill program?

Based on these questions, a technical assistance cost of program model was developed using the following formula:

Farm Bill Technical Assistance Costs = W ($)

Where:

W=Workload in Staff Years
$ = Staff Year Costs

In order to quantify the workload associated with the Farm Bill, EQIP in particular, it was necessary to identify the components or variables. Following is a list of those items that contribute to workload and costs of program delivery.

Variables that affect workload calculations (*W*):
What is typically done?
What is the primary land use?
What administrative tasks are necessary?
What types of practices are planned and installed?
What types of tasks are carried out?

For how many customers
Participations rates - number of contracts
Contract length

Cost *($)* variables include the following:
What programs are charged?
Who is primarily responsible?
What support costs are allowable?

Answers to most of the questions are found in NRCS accountability system databases for time and attendance and in the agency workload analysis. A workload analysis conducted for NRCS at the field office level for fiscal year 2001 contains information on all the types of work necessary to plan and implement natural resources conservation. The data in the workload analysis are based on the NRCS policy governing conservation planning procedures. Some of the data or tasks are program specific.

Participation rates and contract information are found in program managers' databases. NRCS analysts developed a baseline technical assistance model for fiscal years 2001 and 2002. Once the baseline workload model was established, NRCS leadership worked with the analyst to forecast expected changes based on proposed policy and draft guidance for the 2002 Farm Bill.

In order to calculate the technical assistance cost, NRCS program managers worked with an analyst and provided detailed information about the historical average contract length and size and participation rates. In the case of EQIP, the database contains contract start, implementation schedule and finish dates. In addition, the database contains specific information on the types of practices implemented with EQIP. The data documenting how EQIP has been implemented was combined with data from the NRCS Integrated Accountability System (IAS). The IAS includes workload analysis 2001 (WLA) data on the time associated with the delivery of key conservation products, called core work products (CWPs), at the field office level. Each core work product consists of several tasks. The time for completing these tasks and core work products are based on an agency-wide, detailed survey of field office personnel.

The full cost of programs model incorporates:

- average contract sizes,
- contract length,
- participation rates; and
- types of practices along with data describing the actual hours necessary to complete the jobs.

The cost of programs model has been tested and reviewed for technical accuracy and adequacy within NRCS. Based on the model, the following tasks are necessary to carry out the Environmental Quality Incentives Program based on EQIP program purposes and guidance provided to NRCS field office employees:

- Program eligibility determinations (including screening and ranking applications)
- Conservation systems planning
- Development and management of first year contracts
- Management of active long term contracts
- Conservation systems application
- Irrigation water management (with structural components)
- Irrigation water management
- Waste management (waste application)

- Waste management (with structural components)

Average times for carrying out these tasks are found in the NRCS WLA 2001 database. For the NOFA/Proposed Rule alternative, it should be noted that time associated with screening applications are eliminated because of the significant increase in available funds. Also, time associated with conservation planning has been decreased to reflect the inclusion of less complex plans associated with a single practice.

In addition to the tasks associated with carrying out the EQIP program, other key assumptions affect the technical assistance costs. These assumptions deal with participation rates, contract length and contracted financial assistance.

Participation rates

Historical data on the number of applications and the number of approved applications affect the amount of time spent on program eligibility determination. Historically, about 32% of applications were approved.

Contract length and Financial Assistance

Although NRCS receives an annual apportionment, contracts are implemented over time. In a given year, workload for implementation and contract administration exist for prior year contracts. Since the NOFA/Proposed Rule alternative allows for shorter contract lengths and allows participants to install single practices associated with progressive planning, the average contract length in the model is decreased from the historical six years to four years. The average financial assistance for each contract has been increased from the historical $8,700 to $13,000 in fiscal year 2002, and $19,000 in fiscal years 2003 through 2007. This change is due to the fact that the buy-down provision has been removed, and the anticipated entry of large CAFOs into the EQIP program.

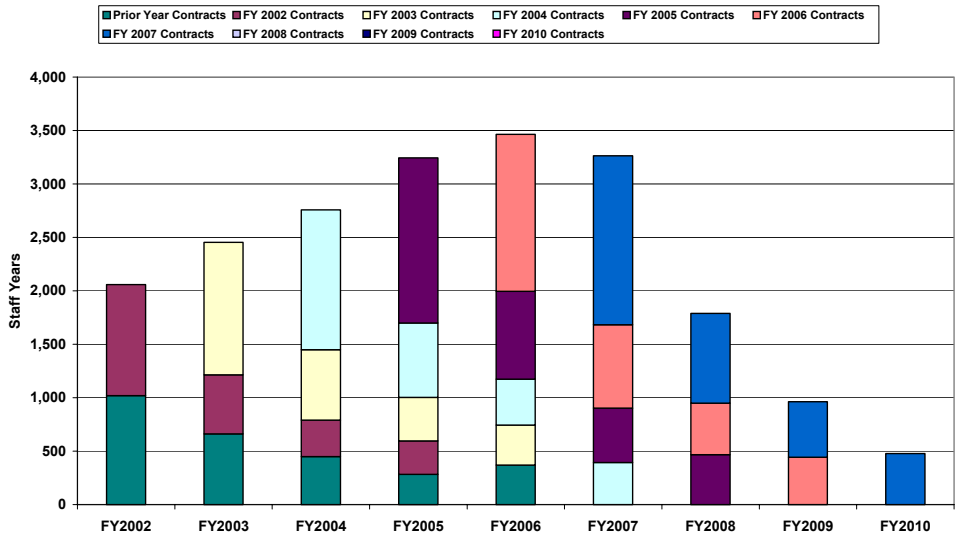
EQIP Technical Assistance Cost - Sensitivity Analysis Comparing Full Cost of Program Implementation to 19 Percent Apportionment

The benefit cost analysis for the EQIP program assumes the full cost of technical assistance based on the projected workload associated with implementing the program. This workload is based on detailed analysis of the individual tasks associated with implementing the program, which includes determining eligibility, ranking applications, managing contracts, and the planning and application of practices. The workload assumes a higher average contract sizes than historical levels because of changes described in the new legislation. Specifically, historical average contract size was $8,700. For the 2002 Farm Bill, this average contract size is projected to be $16,000 in FY 2003, and increase to $19,000 in subsequent years because of the inclusion of large confined animal feeding operations, and the increased payment limitation to $450,000. The model used to determine projected Farm Bill workload is updated continually as policy is developed and more accurate information on contract sizes and lengths is received. As these numbers change, particularly average contract size, so does the total workload and subsequently the required amount of technical assistance. This analysis uses data based on the model version dated September 2002.

It should be noted that the technical assistance requirements associated with the 2002 Farm Bill EQIP include workload from prior years. Even though the Natural Resources Conservation Service typically receives an annual apportionment, historical data show that the typical contract lengths averaged six years. (*See Chart 1.*) Therefore, contracts begun in fiscal year 2001 will have associated workload through fiscal year 2006. Workload from prior year's contracts represents a substantial percent of the total, particularly in the early years of the Farm Bill.

EQIP Technical Assistance Requirements by Initial Contract Year

Chart 1.



Based on these factors, 2002 Farm Bill workload for the Environmental Quality Incentives Program (EQIP) is estimated as shown in Table S-1. In order to determine the total cost of technical assistance necessary to implement EQIP, the Klamath Basin and the GSWC Programs, the workload estimate is multiplied by an average staff year cost. In order to determine the staff years available to address Farm Bill workload if total technical assistance is funded at 19 percent, the Farm Bill Funding level portion is divided by the average staff year cost.

These calculations indicate if the Farm Bill is implemented as outlined in the NOFA, an apportionment of 19% would result in a shortage of available technical assistance to fund internal or external providers. In the first year, 26 percent of the staff years needs (for EQIP only) are for prior year workload. At 19 percent, only 1,641 staff years would be available.

Table S-1. EQIP Staff Year Needs

Table S-1. **EQIP Staff Year Needs Including Klamath Basin and Ground and Surface Water Conservation (GSWC)**

Fiscal Year	Average Staff Year Cost [1/]	Staff Years Needed [2/]	Staff Years Available at 19% TA	Impact on Staff Year Needs
2003	80487	2784	1769	-1015
2004	83439	3115	2435	-680
2005	86393	3517	2792	-725
2006	89465	3751	2696	-1055
2007	92648	3964	2809	-1155

[1/] Projections of staff year costs provided by NRCS BudgetPlanning and Analysis Division.

2/ Full cost of programs model version: October 17, 2002.

Prior year workload is constant and will be provided by NRCS as outlined in contracts that were finalized prior to implementation of the EQIP as outlined in the NOFA. Therefore, historical contract sizes and lengths are used for workload estimates prior to fiscal year 2002. Prior year workload represents about 26% of the EQIP for fiscal year 2003 or about 23% of all three programs. (See Table S-2.) In fiscal year 2004 and 2005 the percentages decrease to 15 and 9 respectively.

The time estimates for ranking applications, planning, applying practices and managing contracts are derived from a detailed Agency workload analysis (WLA 2001). For some tasks, these times have been reduced to reflect less complex planning that might result from contracts that contain a single practice. In absence of other data, these time estimates represent the best estimate of program implementation workload given existing regulations, planning procedures and proposed policy. The effect of reduced technical assistance will negatively affect program delivery.

In the first year of implementation (FY 2003), given that a substantial portion of the workload is for prior year contracts, the ability to process applications, and conduct the conservation planning activities will be reduced. Based on the model, eligibility determinations, planning, and 1st year contract administration will require about 824 staff years in fiscal year 2003. Typically, about 38% of practice application will take place in the first year. For the estimated 32,000 projected new program participants, this would amount to about 545 staff years. Only 28 percent of total staff years necessary (155) for practice application would be available. This shortfall would continue to hamper program delivery for later years.

Table S-2. EQIP Staff Year Availability

Table S-2. **EQIP Staff Year Availability**

Fiscal Year	Average Staff Year Cost 1/	Staff Years Needed 2/	Staff Years Available at 19% TA	Impact on Staff Year Needs	Workload from Prior Years (Staff Years)	SY Available for Farm Bill
2003	80487	2546	1641	-905	662	979
2004	83439	2848	2277	-571	449	1828
2005	86393	3245	2639	-606	283	2356
2006	89465	3465	2548	-917	370	2178
2007	92648	3685	2666	-1019	0	2666

Although third party providers will be participants in the delivery of conservation, no estimate is made of gains or losses in efficiency. The rates for third party providers will not exceed NRCS costs for similar activities according to the proposed rule, therefore their costs are assumed to be the same.

NOFA/Proposed Rule Technical Assistance Summary

Current language authorized the EQIP (including the Ground and Surface Water Conservation Program (GWSC) and Klamath Basin) at $6.1 Billion for fiscal years 2002 through 2007. The capitalized cost using the OMB discount rate of 7 percent is $5 Billion. Based on funding levels proposed in current legislation and the workload analysis model, the amount necessary for technical assistance is $1.4 Billion. This amount reflects a fiscal 2002 apportionment request of 19%, and apportionment request reflecting full program costs in fiscal years 2003 through 2007. Based on the model, this figure would allow for implementation of approximately 260,000 contracts.

Summary of Overall Benefit Cost Ratios for the EQIP Program

Table 1 shows a summary across benefit categories of the estimated benefits and costs associated with EQIP for the "old" (historic) and "new" (NOFA) scenarios evaluated. Note that in contrast to the previous animal waste benefit discussions, which were based on the assumption of 1.0 percent of EQIP funding per size class, here it was assumed

that for the "old" scenario each of the three smallest classes receives 7.5% of the funding, and under the new program, each of the four classes receives 12.5% of the funding. Also, as noted before, neither the benefits for all practices, nor for all the benefits on practices for which some benefits could be counted could be completely accounted for. Consequently, these benefit estimates should be considered as conservative lower bound estimates.

Table 1. Summary of estimated EQIP Benefits and Costs ($ million)[a]

	1996 EQIP rules and funding at $200 million per year for 2002-2007	Rules and Funding According to the 2002 Legislation & NOFA
Benefits:		
Animal Waste Management (Total)[b]	322	3,607
By Operation Size Class (AUs):		
>1000	0	1,680
500 - 1000	142	705
300 - 500	98	620
<300	82	602
Land Treatment Total	1,850	3,172
USLE Reductions	480	620
Grazing Improvement	503	700
Irrigation Improvement/ Water Savings	449	1,132
Air Quality Improvements	115	156
Non-waste Nutrient Management	167	320
Wildlife	135	244
Grand Total Benefits	2,172	6,780
Costs:		
EQIP Funds	978	4,480
Total Costs[c]	2,374	6,600
Benefit Cost (BC) Ratios:		
BC relative to EQIP funds	2.2	1.5
BC relative to total cost	0.9	1.0
Net Benefits over EQIP funds	1,194	2,300
Net Benefits over total cost	-202	180
Waste Treatment Costs Not Cost Shared on Treated AFOs[d]	54.0	177.5
BC relative to total cost minus these private costs	0.9	1.1

[d] This accounts for the costs of contracts above the $450,000 contract limitation

Average cost share for the program: 0.73

Under the old program, the benefits are estimated to be $2.2 billion, with $0.3 billion coming from waste treatment and $1.9 billion from land treatment, yielding net benefits of $1.2 billion, and a BC ratio of 2.2 relative to EQIP funds, and net benefits of $-202 million and a BC ratio of .9 relative to total cost. Under the NOFA, and new program, the benefits are estimated to be $6.8 billion, with $3.6 billion coming from waste treatment and $3.2 billion from land treatment, yielding net benefits of $2.3 billion, and a BC ratio of 1.5 relative to EQIP funds, and net benefits of $180 million and a BC ratio of 1.0 relative to total cost. However, note that the BC ratios relative to total

costs can be greatly improved if costs on treated AFOs that exceed the cost share payment limitations aren't included. In the "old" scenario, the payment limitation was $50,000, but large farms were excluded, and so these costs have only a minor effect. However, in the "new" scenario, the large farms are included and the private costs are approximately $0.5 billion. Excluding these costs yields BC ratios relative to total cost of 1.8 for both the "old" and new scenarios.

Sensitivity of Estimates

The BC ratios found here remain positive for fairly large changes in overall benefit estimates. Since constant marginal benefits are assumed, treating relatively small percentages of the overall resource base, the values shown in Table 14 can be scaled up or down. For example suppose that either units treated or benefits per unit treated were 25 percent lower that what had been estimated. In that case benefits for the "new" program would decline to $8.4 billion, yielding BC ratios of 1.7 relative to EQIP funds and 1.2 relative to total costs. Suppose that ***both*** units treated and per-unit benefits were 25% lower than had been estimated. Then 56% of $11.2 billion, or $6.3 billion results in BC ratios of 1.3 relative to EQIP funds and 0.9 relative to total cost.

Discussion of Alternatives

Alternative 1: Alternatives to AFO/CAFO Funding

Description of Alternative

Alternative 1 explores the option of allocating funding towards different AFO size classifications. The scenarios analyzed are:

- Allocate 25% of funds to each size class;
- Allocate funds proportional to class share in total treatment costs;
- Allocate funds proportional to class share in total AUs;
- Allocate funds proportional to class share in total AFOs;
- Allocate funds mostly to the middle size classes; and
- Allocate 33% of funds to each of the three smaller AFO classes.

Comparison to the Main Proposal – Results for Alternative Distribution Across AFO Size Categories

The effect of alternative assumptions about the fund allocation across size classes is shown in Table 27, under the assumption that per-unit costs and benefits are constant regardless of the number of operations treated. Since the proportion of livestock operations treated is so small, the assumption of constant costs and benefits regardless of level of treatment is probably not too distorting to the net benefits estimates.

Five alternative assumptions about how EQIP funds for waste management might be distributed across the different AFO size classes were evaluated (Table 27). In all scenarios, it was assumed that 50% of total EQIP funds would be available for waste management, less 26% of the 50% for Technical Assistance (TA) costs. All calculations in Table 27 were based on the data from the USDA CNMP Cost and Capability Assessment described above.

Table 27. Animal waste treatment by alternative size class allocation

	Scenarios (allocation of funds to size classes)					
	25% to each	Proportionate to share of total costs	Proportionate to share of total AUs	Proportionate to share of total AFOs	Mostly to middle size	Three smaller classes each get 1/3
Percent of EQIP Funding for Animal Waste (50% of EQIP):						
> 1000	0.25	0.26	0.42	0.04	0.05	0.00
500 to 1000	0.25	0.12	0.10	0.06	0.45	0.33
300 to 500	0.25	0.11	0.08	0.07	0.45	0.33
< 300	0.25	0.51	0.39	0.83	0.05	0.33
Weighted Average BC:						
Relative to EQIP funds	1.60	1.59	1.90	1.17	1.26	1.13
For EQIP and Private Costs	1.17	1.16	1.39	0.85	0.92	0.82
Net Benefits over EQIP Funds	1,354,603,956	1,338,868,808	2,028,848,452	377,606,851	588,921,592	314,142,757
Net Benefits over Total Costs	433,663,118	451,781,835	1,015,947,409	-315,241,239	-232,378,044	-421,460,456
EQIP Fund Allocation[a]:						
> 1000	536,500,000	559,487,974	908,109,104	95,101,139	107,300,000	0
500 to 1000	536,500,000	266,352,382	222,923,136	130,278,047	965,700,000	708,180,000
300 to 500	536,500,000	225,593,247	170,779,153	144,796,031	965,700,000	708,180,000
< 300	536,500,000	1,094,566,397	844,188,607	1,775,824,783	107,300,000	708,180,000
Number of AFOs treated:						
> 1000	3,095	3,228	5,239	549	619	0
500 to 1000	7,251	3,600	3,013	1,761	13,051	9,571
300 to 500	9,249	3,889	2,944	2,496	16,648	12,209
< 300	22,298	45,491	35,085	73,805	4,460	29,433
All	41,893	56,208	46,282	78,611	34,778	51,213
Number AUs treated:						
> 1000	6,193,108	6,458,471	10,482,792	1,097,804	1,238,622	0
500 to 1000	2,599,701	1,290,655	1,080,211	631,284	4,679,461	3,431,605
300 to 500	2,285,789	961,153	727,614	616,912	4,114,420	3,017,241
< 300	2,221,025	4,531,332	3,494,807	7,351,633	444,205	2,931,753
All	13,299,622	13,241,610	15,785,424	9,697,633	10,476,707	9,380,599
Hours of TA	5,207,862	6,529,726	5,481,719	8,792,884	4,687,115	6,245,171
FTE of TA (2080 hours)	2,504	3,139	2,635	4,227	2,253	3,002
Cost of TA at $40/hour	208,314,483	261,189,053	219,268,748	351,715,378	187,484,606	249,806,853

[a]Assumes a total of 50% of EQIP funding, less the TA deduction; treatment cost assumed constant over time in this section.

In Table 27, the percent of total EQIP funding for animal waste allocated to each size class in each scenario was computed using data from the previous tables. Allocating based on share of total AUs results in 42 percent of the funding going to the largest size class, and achieving the greatest net benefits of $2.02 billion and $1.02 billion for EQIP funds and total costs. Conversely, the allocation based on share in numbers of operations, the largest size class would only receive 4 percent of the funding and would achieve much lower net benefits of $378 million and $-315 million for EQIP funds and total costs. Clearly, some efficiency is lost due to the fact that it costs more per animal unit to treat the smaller size class CAFOs than the large farms.

Table 27 shows that the strategy generating the highest overall BC ratio (of the six alternatives evaluated) is to allocate the funds across the size classes according to their proportionate share in total number of AUs. That strategy would result in treatment of 15.8 million AUs, compared to as low as 9.4 million AUs for the strategy with the lowest BC ratio (allocation divided evenly to the 3 smallest size classes.) The more that funds are shifted towards the larger AFOs, the larger the number of AUs treated, the lower the TA cost, and the greater the estimated benefits.

If farms with greater than 1000 animal units remained excluded from EQIP funding for animal waste practices, a total of 11,400 farms, with a total of 23 million animal units, and an overall need of $500 million in CNMP costs would remain untreated (Table 19). Table 27 highlights the outcomes of the scenario of not funding large CAFOs. The last column assumes that each of the smaller size classes receive 1/3 of the funding for animal waste. This analysis shows that although the overall benefit cost ratio would still exceed 1, net benefits would be the lowest of all scenarios, with $314 million for EQIP funds and $-421 million for total costs.

It could be expected that the between 17% (9.4 million) and 29% (15.8 million) of total animal units could be treated through the EQIP program.

A desirable strategy might be to focus the funds on the 500 to 1000 and 300 to 500 classes. The largest class are already under regulation and should be more able to arrange and afford private financing of the required animal waste management than the smaller classes, and the per AU treatment cost of the smallest class is much higher that for the middle size classes. Decisions should also take account of social considerations, as well as the TA component in terms of the estimate of hours required for the CNMP implementation. The more the funds are shifted towards the larger operations, the lower the TA requirement on a per-AU and on a per-AFO basis.

Alternative 2: Payment Limits Between $50,000 and $450,000

Description of Alternative

Alternative 2 analyzes the effects of various payment limitations from $50,000 (consistent with the old EQIP program) and the legislated maximum of $450,000. All other provisions of this alternative are the same as the recommended plan. In practice, limiting payments would effectively limit EQIP program attractiveness to small and medium sized producers. Large producers would probably not find the lower payment limitation options attractive to them, since many of their practices are high cost options due to the scale of their operations. They would therefore be less likely to participate.

Conservation practices on strictly crop farms are not nearly as costly as animal waste practices, therefore relatively few crop producers would be directly affected by the increased payment limitations. Since livestock producers incur much greater costs for implementing animal waste practices when compared to their crop producing counterparts, the payment limitations could have great bearing on their ability to participate in the EQIP program.

Analysts working on the USDA CNMP Cost and Capability study developed a model that estimates the costs of implementing Comprehensive Nutrient Management Plans on every one of the 257,000 livestock farms in the U.S. Additional analysis was conducted to determine how many farms, by size class, livestock type, and region of the U. S. that would be affected by various payment limitation schemes.

For analysis purposes, various incremental payment limitations were analyzed though the CNMP CCA model. The payment limitations were:

- $50,000 – same as old EQIP Program payment limitation
- $100,000
- $200,000
- $300,000
- $450,000 – maximum payment limitation according to legislation

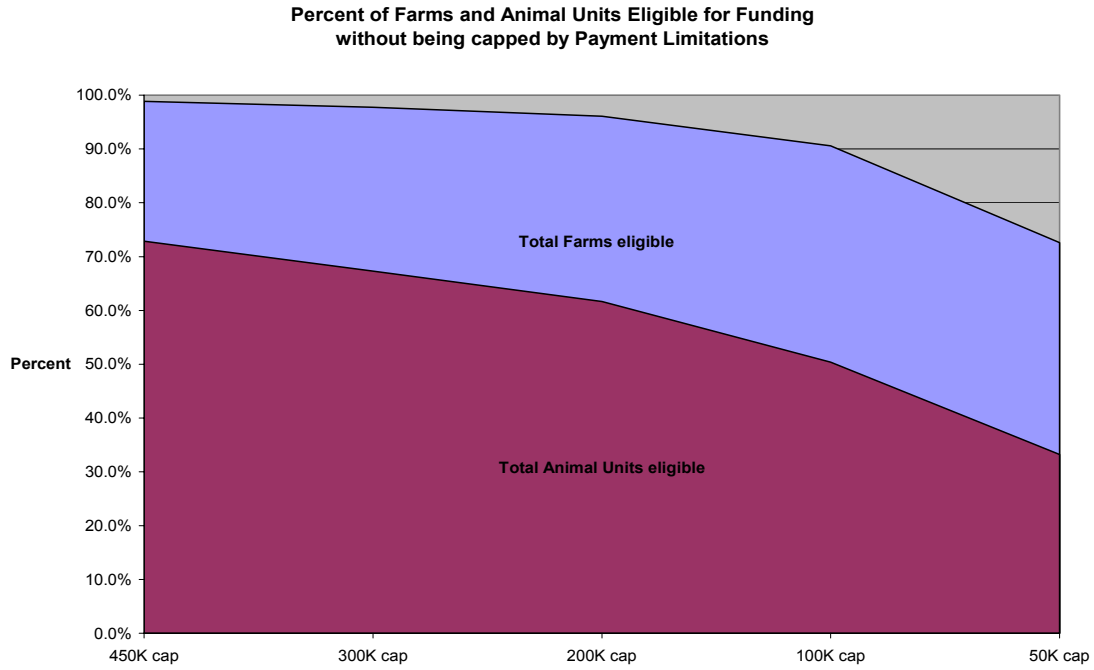
Comparison to the Main Proposal

This analysis compares the number of farms that would be eligible for funding *without* reaching the payment limitation cap. Of course, farms that reach the payment limitation, or cap, would still be eligible for funding, the producer of those capped farms would bear a greater burden of the cost of implementing the animal waste practices.

Although the various payment limitations do not have great bearing on the total number of farms that would be affected by the caps, a significant number of animal units could be eligible for funding without payment limitations at the higher cap levels.

At the $450,000 payment limitation level, only 1% of the remaining livestock farms would still be capped in the costs of implementing animal waste conservation practices. However, those 1% farms control 27% of the animal units. These represent the biggest farms with the highest costs.

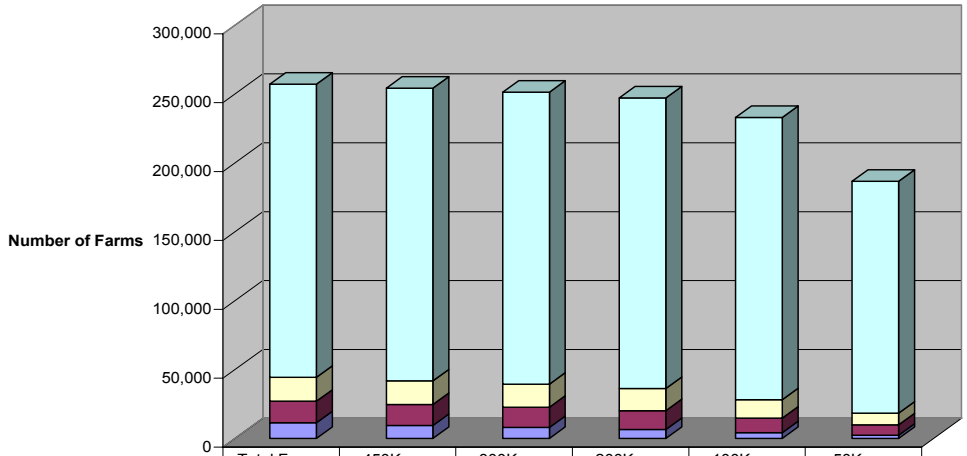
Between the $50,000 and $100,000 payment limitation levels, there is relatively greater elasticity in the number of eligible farms. This becomes more inelastic as the payment limitations increase, until it is almost completely inelastic between $300,000 and $450,000. This is apparent when a 33% increase in payment limitation results in only a 1.1% increase in the number of farms that would fall under the cap. In other words, while an additional $50,000 payment limitation increase (between the lower cap of $50,000 to $100,000) would bring an additional 46,217 farms eligible under the cap, at the higher levels of payment limitations (between $300,000 and $450,000), a $150,000 increase in payment limitations only brings an additional 2,863 farms under the cap.



Although there is relatively few additional farms that would be funded as payment limitations increase, the number of animal units that these farms control increase at a faster rate. In this case, between the $50,000 and $100,000 payment limitation schemes, the additional $50,000 would deem and additional 9 million animal units eligible for funding under the payment limitation. However between the $300,000 and $450,000 payment limitation schemes, the additional $150,000 (three times the increase) would only increase the number of animal units by just under 3 million, or one-third the increase.

The following graphs illustrate what size of farms would be affected by the various payment limitations. The first graph shows that at the $50,000 payment limitation level, 79% of the smaller farms would be eligible without a cap, while only 21% of the large farms would also be so. Between $50,000 and $100,000, the majority of the smaller farms (96%) would be eligible for funding without being capped, however only 36% of the larger farms would be eligible as well. At the $200,000 payment limitation, just over half (56%) of the large farms would fall into eligibility, while 99% of the smaller farms do so.

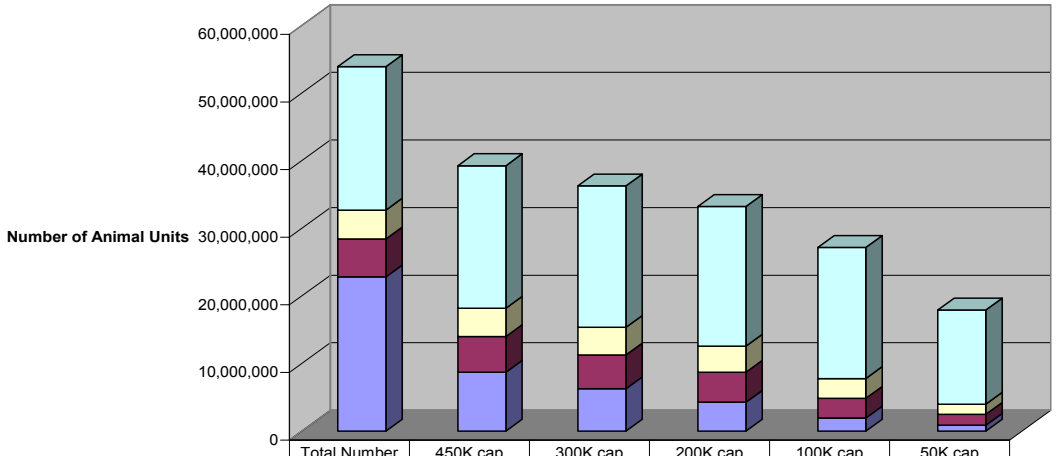
Number of Farms that Would Not Be Effected by Payment Limitations



	Total Farms	450K cap	300K cap	200K cap	100K cap	50K cap
<300 EPA animal units	212,835	212,498	211,974	210,861	204,789	168,443
300-500 EPA animal units	17,354	17,083	16,782	16,193	13,458	8,456
500-1000 EPA animal units	15,614	15,155	14,651	13,667	10,563	7,445
>1000 EPA animal units	11,398	9,472	7,938	6,412	4,122	2,371

The next graph tells a slightly different story. At the $50,000 payment limitation, only 33% of the livestock farms' animal units would be eligible for funding without reaching the cap. At $100,000, half of the nation's animal units would qualify for EQIP funding without reaching the cap, and at the $450,000, almost three quarters of the nation's animal units would qualify for EQIP funding without reaching the payment limitation cap.

Number of Animal Units by Farm Size that Would Not Be Effected by Payment Limitations



	Total Number	450K cap	300K cap	200K cap	100K cap	50K cap
<300 EPA animal units	21,200,208	21,085,259	20,923,499	20,675,312	19,361,688	13,917,893
300-500 EPA animal units	4,288,797	4,179,560	4,076,263	3,858,262	2,949,871	1,492,439
500-1000 EPA animal units	5,598,295	5,282,313	4,993,761	4,415,862	2,894,104	1,611,924
>1000 EPA animal units	22,805,451	8,706,367	6,273,207	4,282,197	1,942,902	882,889

Payment Limitations

Whether measuring efficiency by number of farms, or number of animal units, the increase in payment limitations causes a significant decrease in the program efficiency of increasing farm eligibility. Tables 28 and 29 provide additional data on the effects of the various payment limitation caps on farm size, as well as livestock type, and by various regions of the U. S.

Table 28. Definition of livestock operations that would not reach payment limitations (caps)

	Number of Animal Feeding Operations					
	Total Farms	**450K cap**	**300K cap**	**200K cap**	**100K cap**	**50K cap**
By farm size:						
>1000 EPA animal units	11,398	9,472	7,938	6,412	4,122	2,371
500-1000 EPA animal units	15,614	15,155	14,651	13,667	10,563	7,445
300-500 EPA animal units	17,354	17,083	16,782	16,193	13,458	8,456
<300 EPA animal units	212,835	212,498	211,974	210,861	204,789	168,443
Total	257,201	254,208	251,345	247,133	232,932	186,715
By USDA Farm Production Region:						
Appalachian states	22,899	22361	21,585	20,947	19,559	16,786
Corn belt states	71,540	71288	70,905	69,996	65,515	52,144
Delta states	12,352	12256	12,127	11,957	11,673	10,877
Lake states	52,817	52706	52,580	52,320	51,005	39,502
Mountain states	7,964	7780	7,669	7,518	7,079	6,366
Northeast	31,598	31241	30,693	29,870	26,016	14,312
Northern plains	26,309	25990	25,840	25,664	25,024	22,473
Pacific states	7,974	7213	6,920	6,432	5,675	4,920
Southeast	12,807	12635	12,351	11,852	11,177	10,148
Southern plains	10,941	10738	10,675	10,577	10,209	9,187
By Dominant Livestock Type:						
Fattened cattle	10,159	9581	9,350	9,045	8,094	6,357
Milk cows	79,318	78053	77,116	75,459	68,346	36,850
Swine	32,955	32326	31,176	29,891	25,683	16,206
Turkeys	3,213	2992	2,829	2,601	2,061	1,290
Broilers	16,251	16189	16,131	16,008	15,568	14,275
Layers/pullets	5,326	5138	4,879	4,364	3,777	3,246
Confined heifers/veal	4,011	3966	3,911	3,826	3,577	3167
Other AFOs[1]	105,968	105963	105,953	105,939	105,826	105,324
All farms		254,208	251,345	247,133	232,932	186,715

	Percent of Farms				
By farm size:					
>1000 EPA animal units	83.1%	69.6%	56.3%	36.2%	20.8%
500-1000 EPA animal units	97.1%	93.8%	87.5%	67.7%	47.7%
300-500 EPA animal units	98.4%	96.7%	93.3%	77.5%	48.7%
<300 EPA animal units	99.8%	99.6%	99.1%	96.2%	79.1%
By USDA Farm Production Region:					
Appalachian states	97.7%	94.3%	91.5%	85.4%	73.3%
Corn belt states	99.6%	99.1%	97.8%	91.6%	72.9%
Delta states	99.2%	98.2%	96.8%	94.5%	88.1%
Lake states	99.8%	99.6%	99.1%	96.6%	74.8%

Mountain states	97.7%	96.3%	94.4%	88.9%	79.9%
Northeast	98.9%	97.1%	94.5%	82.3%	45.3%
Northern plains	98.8%	98.2%	97.5%	95.1%	85.4%
Pacific states	90.5%	86.8%	80.7%	71.2%	61.7%
Southeast	98.7%	96.4%	92.5%	87.3%	79.2%
Southern plains	98.1%	97.6%	96.7%	93.3%	84.0%
By Dominant Livestock Type:					
Fattened cattle	94.3%	92.0%	89.0%	79.7%	62.6%
Milk cows	98.4%	97.2%	95.1%	86.2%	46.5%
Swine	98.1%	94.6%	90.7%	77.9%	49.2%
Turkeys	93.1%	88.0%	81.0%	64.1%	40.1%
Broilers	99.6%	99.3%	98.5%	95.8%	87.8%
Layers/pullets	96.5%	91.6%	81.9%	70.9%	60.9%
Confined heifers/veal	98.9%	97.5%	95.4%	89.2%	79.0%
Other AFOs[1]	100.0%	100.0%	100.0%	99.9%	99.4%

[1] includes small farms with confined livestock types, pastured livestock types, and specialty livestock types

Table 29. Definition of Number of Animal Units that would not reach payment limitations (caps)

	Total Number	450K cap	300K cap	200K cap	100K cap	50K cap
By farm size:						
>1000 EPA animal units	22,805,451	8,706,367	6,273,207	4,282,197	1,942,902	882,889
500-1000 EPA animal units	5,598,295	5,282,313	4,993,761	4,415,862	2,894,104	1,611,924
300-500 EPA animal units	4,288,797	4,179,560	4,076,263	3,858,262	2,949,871	1,492,439
<300 EPA animal units	21,200,208	21,085,259	20,923,499	20,675,312	19,361,688	13,917,893
Total	53,892,752	39,253,498	36,266,730	33,231,633	27,148,565	17,905,144
By USDA Farm Production Region:						
Appalachian states	4,624,716	3,759,948	3,194,260	2,855,158	2,273,200	1,584,642
Corn belt states	9,815,629	8,946,586	8,528,445	7,906,767	6,279,613	3,843,037
Delta states	2,105,031	1,979,343	1,923,983	1,830,480	1,683,172	1,388,872
Lake states	6,409,879	6,008,447	5,823,391	5,547,628	4,897,716	2,839,872
Mountain states	4,721,252	2,495,297	2,178,543	1,898,641	1,493,169	1,101,880
Northeast	3,903,616	3,584,755	3,367,764	3,078,792	2,281,812	888,420
Northern plains	9,209,951	5,100,004	4,703,505	4,421,994	3,818,265	2,945,374
Pacific states	4,781,958	2,832,343	2,314,182	1,778,518	1,135,806	749,552
Southeast	2,467,085	2,212,352	2,048,363	1,889,806	1,612,719	1,299,449
Southern plains	5,853,636	2,334,422	2,184,296	2,023,849	1,673,094	1,264,045
By Dominant Livestock Type:						
Fattened cattle	13,193,896	9,342,533	9,870,387	10,267,625	11,004,955	11,624,115
Milk cows	15,448,663	2,074,889	3,079,218	4,231,407	6,666,728	11,810,413
Swine	9,073,203	1,889,393	2,796,768	3,616,476	5,322,087	7,235,894
Turkeys	2,206,628	639,019	835,214	1,058,566	1,448,258	1,847,178
Broilers	2,966,935	106,583	133,584	208,794	368,256	764,473
Layers/pullets	1,583,907	316,026	475,110	654,160	894,008	1,068,903

Confined heifers/veal	1,209,375	222,008	305,162	431,482	605,076	768384.47
Other AFOs[1]	8,210,145	48,804	130,580	192,611	434,820	868,247
All farms	53,892,752	14,639,254	17,626,022	20,661,119	26,744,187	35,987,608

	Percent of USDA Animal Units				
By farm size:					
>1000 EPA animal units	38.2%	27.5%	18.8%	8.5%	3.9%
500-1000 EPA animal units	94.4%	89.2%	78.9%	51.7%	28.8%
300-500 EPA animal units	97.5%	95.0%	90.0%	68.8%	34.8%
<300 EPA animal units	99.5%	98.7%	97.5%	91.3%	65.6%
By USDA Farm Production Region:					
Appalachian states	81.3%	69.1%	61.7%	49.2%	34.3%
Corn belt states	91.1%	86.9%	80.6%	64.0%	39.2%
Delta states	94.0%	91.4%	87.0%	80.0%	66.0%
Lake states	93.7%	90.9%	86.5%	76.4%	44.3%
Mountain states	52.9%	46.1%	40.2%	31.6%	23.3%
Northeast	91.8%	86.3%	78.9%	58.5%	22.8%
Northern plains	55.4%	51.1%	48.0%	41.5%	32.0%
Pacific states	59.2%	48.4%	37.2%	23.8%	15.7%
Southeast	89.7%	83.0%	76.6%	65.4%	52.7%
Southern plains	39.9%	37.3%	34.6%	28.6%	21.6%
By Dominant Livestock Type:					
Fattened cattle	70.8%	74.8%	77.8%	83.4%	88.1%
Milk cows	13.4%	19.9%	27.4%	43.2%	76.4%
Swine	20.8%	30.8%	39.9%	58.7%	79.8%
Turkeys	29.0%	37.9%	48.0%	65.6%	83.7%
Broilers	3.6%	4.5%	7.0%	12.4%	25.8%
Layers/pullets	20.0%	30.0%	41.3%	56.4%	67.5%
Confined heifers/veal	18.4%	25.2%	35.7%	50.0%	63.5%
Other AFOs[1]	0.6%	1.6%	2.3%	5.3%	10.6%

[1] includes small farms with confined livestock types, pastured livestock types, and specialty livestock types

Alternative 3: Alternative Application Evaluation Procedures to Ensure Cost-effective, Environmentally-targeted Fund Allocation

Description of Alternative

Priority areas were introduced in the original EQIP program as a process to direct limited conservation funds to areas of greatest environmental concern. In general, priority areas were defined as watersheds, regions, or environmentally sensitive areas having significant soil, water, or related natural resource concerns. The program requirement was to use at least 65 percent of EQIP funds in designated priority areas.

The NOFA/Proposed Rule alternative eliminates the process of designating funds to conservation priority areas, removes the buy-down provision and an offer index that has cost factor as a denominator in EQIP. States have the flexibility to develop a funding allocation procedure to best fit the needs of the state. There is some concern that this will have a negative impact on the potential environmental benefits due to the fact that funds may not be targeted to

specific geographic areas, and the environmental effects of practice implementation will be diluted by scattering cost share assistance over a much broader area. This section discusses alternatives to priority area designation and the potential impacts to the program. Six different alternatives are identified:

- Homogeneous evaluation process (NOFA/Proposed Rule)
- Spatial evaluation process
- Allocation and evaluation by Resource Concern
- Variable cost share rates
- Allocation formula
- Holdback

In reality, the likelihood of any state selecting or integrating only one of these alternatives is remote. The best alternative will result from some combination of the above options that are best determined at the local level, plus other alternatives developed by states that this group is unable to anticipate at this time. However, since the combinations and variations are so numerous, that it is beyond the scope of this analysis to estimate the impacts of every combination. Each alternative is being analyzed and discussed on a stand-alone basis.

The following matrix highlights the various alternatives and summarizes the expected effects on National Priorities:

Expected Effects on National Priorities

PROCESS	DESCRIPTION	EFFECT(s)
Homogenous	No Action Alternative (NOFA/Proposed Rule). Evaluation scoring system treats all applications and resource concerns with the same point system.	Spreads funds over a wider area. More broadly acceptable since all applicants would have an equal opportunity to participate. Impacts are less concentrated. Less noticeable because impacts may not be concentrated.
Spatial Process	Additional points awarded for special emphasis areas; 303d, T&E species, Critical Habitat, etc.	Improved targeting of natural resource concerns. Benefits may be increased due to concentration of effects on critical areas or resource concerns
Cost Share Rate (1)	Vary cost-share rates by practice according to effects on resource concerns.	+ Targets funding by varying cost share towards resources with priority concerns. - May not be popular if historically popular practices receive low c/s rates. - Hard to determine effect on net benefits due to unknown demand curves.
Fund by Resource Concern	Evaluate each resource concern separately and fund using separate accounts.	- Ignores multiple resource concern interaction. + Ensures that all resource concerns would "receive a piece of the pie". + Popular with environmental or special interest groups.
Allocation Formula	Fund transfer from the National level to states then on to a localized area (county, district, etc.).	+ Politically acceptable. Puts decision making in the hands of local work groups. + Allows state to develop priority concerns and allocate to areas with greatest need.
Cost Share Rate (2)	Vary marginal cost-share rates according to cost-of-practice.	+ Makes EQIP available to more participants: more equitable + assuming the large practices will be implemented even at lower cost-share, EQIP funds will buy more conservation - May not be politically popular with large farms.
Holdback	A percent of national funds held back for allocation to states with efficient evaluation methods.	+ Incentive for states to meet or exceed national priorities. National priorities are generally vague. How to develop a fair scoring system for states

		competing for limited funding. Certain national priorities (air quality) not a problem nationwide. Fairness issue.

Spatial vs. Homogeneous evaluation process.

Description

A homogeneous evaluation process consists of identically scored criteria used to evaluate applications across an entire area, most likely statewide. This criterion is based upon the identified resource concerns in that state. Each state can develop an evaluation system based on any number of resource indicators such as tons of erosion, change in productive efficiency, change in practice types, management system rating, number of Animal Units, etc. Points are awarded based on a projected or estimated impact regardless of location or proximity criteria.

Conversely, a spatial evaluation process would award points for positive impacts to sensitive areas, proximity to protected or critical areas, or some location-based criteria. These "special emphasis" items may consist of non-boundary delimited areas such as such as impaired water bodies (303d listed water bodies, etc.), threatened/endangered species, proximity to critical habitat areas, proximity to fragile or protected areas, etc. This alternative suggests that states would set criteria similar to those of designating priority areas used in the past. However, these "special emphasis" items would not be limited to a defined boundary or watershed. In addition, EQIP funds would not be specifically designated to any spatial area, rather, additional points would be assigned to applications that fall under the spatial boundaries. States would have the ability to target priority resource concerns, critical habitat, or other areas deemed important within that state without being constrained to fund these with at least 65% of funds as under the old EQIP rule.

Current guidelines contain only general definitions of what may be included in an evaluation process, stating that each State Conservationist, with the advice of the State Technical Committee, will develop a process to evaluate and prioritize EQIP applications. This process will be used to select applications that achieve national priorities and optimize environmental benefits. Prioritization by area, as was used in the old EQIP program, has been removed. Therefore, in evaluating alternative approaches to priority area designation and fund allocation, the homogeneous evaluation procedure is being considered the "No Action" or NOFA/Proposed Rule alternative. This is the benchmark that all other alternatives will be compared to.

Comparison to NOFA/Proposed Rule

Although not identical to the priority area designation process of the previous EQIP program, this alternative would most likely exhibit the most traits from that process. States would have the ability to target priority resource concerns, critical habitat, or other areas deemed important within that state, however they still will not be constrained by the 65% restriction under the old EQIP rule. The overall impact may be an increase in net benefits over the NOFA/Proposed Rule alternative due to the concentration of funding into these critical areas or resource concerns.

To simulate a spatially targeted evaluation process the national funds by resource concern contracted in priority areas were compared to how funds were contracted by statewide resource concern. Comparing the share of funds by resource concern in the two cases yields the percent change in the share of total funds that would go to each resource concern were a spatial evaluation procedure to be adopted. The percent changes in the share of funds received are presented in the table below. The shift to a spatially targeted procedure, assuming it would reflect the natural resource concerns expressed for priority areas, would shift funds away from grazing and wind erosion/air quality, and redirecting them to water savings and non-waste nutrient management.

Impact of adopting a spatial evaluation on funding to resource concerns

Resource Concern	Percent change in funding
Grazing	-30.1
Waste management	-0.9
Non-waste Nutrient Management	25.5
Soil Erosion	-0.9
Water Savings/Irrigation	80.1
Wildlife	-5.1
Wind Erosion/Air Quality	-35.9

Another issue that arises when considering a spatial evaluation procedure is the extent to which benefits per acre increase if contracts are entered targeting the most sensitive areas. We assume here that:

1. practices addressing soil erosion, animal waste nutrient, or non-waste nutrients would produce more benefits if additional points were given to farms in the proximity of 303d listed water bodies
2. wildlife practices would produce more benefits if targeted critical habitat areas or wildlife corridors
3. water saving practices would be more beneficial if downstream users and aquifer conditions are considered. Grazing productivity benefits are not assumed to be affected by a spatial evaluation procedure.

Since the magnitude of the benefit improvement with a spatial approach is not known, it is assumed here that the benefits would improve in the 0% to 40% range. The benefits of applying a spatial evaluation procedure are presented in the following table. The first row indicates the impact of shifting the funds to resource concerns according to the funding of concerns in priority areas in the old program. It appears that acres treated would increase by 7.6%, and even without any improvement in environmental efficiency there would be a 4.3% increase in the aggregate benefits of the program. However, there might be an improvement in per acre benefits with a spatial evaluation procedure. If that were the case, then a 20% improvement in unit benefits, combined with shifting the funds as in the previous row, would entail a 23.7% increase in benefits, whereas a 40% improvement would result in a 43.1% increase in benefits.

Benefits of spatial targeting: funding shifts in combination with assumptions on improvement in environmental efficiency

Unit benefit improvement	Acres Treated	Benefits (%)	Net Benefits above EQIP funds (%)
0% improvement	7.6%	4.3%	12.7%
20% improvement	7.6%	23.7%	69.9%
40% improvement	7.6%	43.1%	127.1%
Note: improvements in benefits/acre occur for: soil erosion, water savings, wind erosion, non-waste nutrient management, wildlife, waste management			

The results in the above table indicate that adopting a spatial evaluation procedure could enhance considerably the benefits accruing from the program. The magnitude of the improvement clearly depends on the assumptions made; however, environmental benefits would definitely improve. The only drawback this approach may have is that it may be administratively more burdensome in terms of processing all the data required.

Appendix 2 shows a counter-analysis, showing the reduction in environmental efficiency that could result by addressing soil erosion concerns in a Priority Area situation. Soil erosion occurs on a field-by-field basis, that can be better addressed with an homogenous ranking process. The higher the current soil erosion in a field, the higher the projected ranking, and the better targeting on a field-by-field basis for overall all soil erosion reductions. The larger the area being ranked, the higher the average erosion of the fields being controlled. With the elimination of priority areas, there is potential for the new program achieving higher average erosion reductions than the old program.

Variable cost-share rates: targeting resource concerns

Description

An alternative to setting all cost share at the maximum allowable rates, is to vary cost share rates on a practice-by-practice case as a means of controlling fund allocation. The rates could vary as a means to direct funds towards those practices that most effectively address the identified resource concerns at the local level.

Variable cost-share rates would add a degree of control to the fund allocation process. Practices with a lowered incentive should also lower the corresponding demand for that practice. Similarly, practices with a higher incentive should increase the corresponding demand for that practice. Consequently, funds should logically flow into practices with higher incentives, which would be those deemed to have a significant positive impact on the priority resource concerns. Theoretically, this should work. However, the one unknown factor in this equation is that of individual

demand curves for each conservation practice. States would need to make a determination of how much of an increase or decrease in the incentive is needed, and how would demand respond. Here it is assumed that demand for practices with reduced cost-shares is assumed to be linear. Therefore demand decreases proportionally to the decrease in cost share rate (relative to the highest average cost share available).

Table 30: variable cost-share rate (expressed as percentage changes from original setting)

	cost share														B C ratios	
	USLE Reduct-ions	Grazing Product-ivity	Water Savings	Wind erosion	Non-waste nutrient	Wildlife Habitat	Livestock-related benefits ($/AU)	Acres Treated (1000s)	AUs Treated (1000s)	Benefits (millions)	EQIP funds	Total Cost (millions)	Net Benefits above EQIP funds	Net Benefits above total cost	to EQIP	to TC
Variations:																
National priorites (mild):																
reduced cost share for erosion & wildlife	0.60	0.60	0.75	0.75	0.75	0.60	0.75	16	0	5	0	2	14	96	5	5
National priorites (aggressive):																
reduced cost share for erosion & wildlife	0.50	0.50	0.75	0.75	0.75	0.50	0.75	26	0	8	0	4	23	165	8	8
Reduced average cost-share:																
across the board	0.65	0.65	0.65	0.65	0.65	0.65	0.65	15	11	13	0	14	38	-9	13	-1
National priorites (aggressive): + reduced average cost share	0.50	0.50	0.65	0.65	0.65	0.50	0.65	36	11	19	0	17	57	121	19	5

Comparison to NOFA/Proposed Rule

In the analysis presented here, based on Table 30, the average cost-share rate by benefit category is varied according to whether it is relevant to the national priorities listed in the legislation (air and water quality). Two scenarios are presented: in the "mild" version, the average cost shares for soil erosion reduction, grazing productivity, and wildlife habitat are reduced to 60%, in the "aggressive" scenario they are reduced to 50%. These express different degrees to which the national priorities are being pursued. The results indicate that pursuing national priorities by cost sharing air and water quality concerns at a higher rate (relative to the other concerns), increases total benefits by 5% in the "mild" case and by 8% in the more aggressive case.

The third row in Table 30 illustrate the possibility that average practice costs shares are reduced evenly (from 75% assumed in the NOFA to 65%) by reducing the cost-shares of those practices that are considered less effective in each benefit category. This would create, as one would expect, a considerable increase in the benefits (13%), however, it would shift the overall burden towards farmers. This is indicated by the lower benefit to total cost ratio of this option.

Finally, the last row is a combination of the overall reduction on cost-share rates combined with targeting national priorities aggressively. This appears to be the preferred solution among those adopting a variable cost share. The increase in benefits is substantial (19% relative to the NOFA) and the burden on farmers increases proportionately less than the benefits (the benefit to total cost ratio increases by 5%).

Varying average cost-share rates by resource concern (results are percent change from NOFA)

(from Table 30)

Variations:	Acres Treated	AUs Treated	Benefits	Net Benefits above EQIP funds
National priorities (mild): reduced cost share for erosion & wildlife	15.71%	0%	4.7%	13.7%
National priorities (aggressive): reduced cost share for erosion & wildlife	26.1%	0%	7.8%	23.1%
Reduced average cost-share: across the board	15.4%	10.9%	13.0%	38.4%
National priorities (aggressive): + reduced average cost share	36.1%	10.9%	19.3%	56.9%

Although not a limiting factor, this alternative would also add substantial administrative burden in the contracting process. It would take a certain amount of time to ensure that all contract items are included at the proper rate. The potential for error in data entry into the payment software system would increase, causing possible inequities to producers. Nonetheless, as one would expect, the overall impact on net benefits increases over the NOFA/Proposed Rule alternative for all cases considered the above table.

Local Allocation and evaluation by Resource Concern

Description

Fund allocation and evaluation by resource concern has been used by states in the past, previously known as "State-wide Resource Concerns". Such a scheme will likely continue at some level in future EQIP funding decisions. The basis for this alternative is that competing resource concerns may not have an equal opportunity to receive funding due to inequities in the evaluation process. In general, it's comparable to the old familiar statement, "comparing apples and oranges". It is more a question of how to develop an evaluation process that compares distinctly different variables equally between one or more resource concerns. It is much easier to allocate funds to each resource concern, develop separate evaluation procedures, and evaluate applications within rather than between resource concerns.

Comparison to NOFA/Proposed Rule

This alternative is more acceptable to environmental or special interest groups concerned that funding is not shared equally among all resources. By allocating funds and evaluating by resource concern, this alternative guarantees that all resources designated as being a priority statewide concern have an opportunity to receive funding. Politically, this would be an acceptable alternative since it spreads funds to address the needs of more groups. However, the negative impact is that funding decisions may become more political in nature rather than environmentally based.

Depending on how the evaluation scoring is set up in each state, this alternative may ignore the interaction between multiple resources. For example, grazing land health and productivity has multiple benefits over and above what could be measured or estimated within the resource concern. Water quality is improved, wildlife habitat is increased, and soil quality is improved, to name only a few. However, if the evaluation process does not attempt to measure these multiple resource impacts, the result may not be the funding of contracts with the overall highest net benefit.

On the other hand, resource concerns with the most to gain with this alternative would be those with historically low participation or interest by landowners or operators. Resource concerns such as wildlife habitat, wetland restoration or enhancement, riparian development, etc., that are popular with environmental groups, but perceived by landowners as having a low monetary return to investment are examples of this type of resource concern. The largest beneficiaries of generated benefits are off-site, realized by the general public in the form of increased wildlife, improved water and air quality, etc.

Table 31 illustrates how benefits change if the allocation of funds to land treatment practices is modified. In the first row (left section) the assumed funding shares for the NOFA are reported (based on historical EQIP data). In each of the following rows, the share of funds is increased by 5% for one category while they are reduced by 1% for the other five categories. For example, in the second row the share of funds for USLE reductions is increased from 5.4% to 10.4% and the funding shares of the other categories are reduced by 1% each. By law, 60% of EQIP funds are assigned for livestock-related practices. Therefore the share of funds to livestock-related practices was not modified.

The percent changes in benefits reported in table 31 indicate that increasing the funds towards reducing non-waste nutrients would be most beneficial in aggregate terms (a 7% increase in benefits) while increasing the share of funds to wind erosion reduction practices would be the least beneficial (a 4% reduction in total benefits). This table is meant to highlight the tradeoffs involved in shifting funds across resource concerns: the greater benefits accruing from practices relating to the emphasized resource concerns have to be weighed with the reduced benefits in terms of the other resource concerns. Clearly, the tradeoffs presented here are heavily dependent on the assumptions made for valuing the benefits.

Change in Fund Allocation relative to resource concern

expressed as % difference from NOFA/Proposed Rule

	Acres Treated (%)	Benefits (%)	Net Benefits above EQIP funds (%)
Increase share of funds to USLE Reductions (%)	-19	3	8
Increase share of funds to Grazing Productivity	-18	-3	-9
Increase share of funds to Water Savings	-17	-2	-6
Increase share of funds to Wind erosion	-5	-4	-11
Increase share of funds to Non-waste nutrient	59	7	21
Increase share of funds to Wildlife Habitat	-1	-1	-4

Table 31: Change fund allocation by resource concern.(expressed as % difference form original settings)

	cost share														B C ratios	
	USLE Reductions	Grazing Productivity	Water Savings	Wind erosion	Non-waste nutrient	Wildlife Habitat	Livestock-related benefits ($/AU)	Acres Treated (1000s)	AUs Treated (1000s)	Benefits (millions)	EQIP funds	Total Cost (millions)	Net Benefits above EQIP funds	Net Benefits above total cost	to EQIP	to TC
Variations:																
Increase share of funds to USLE Reductions	0.104	0.128	0.092	0.027	0.009	0.026	0.613	-19	0	3	0	0	8	103	3	5
Increase share of funds to Grazing Productivity	0.044	0.188	0.092	0.027	0.009	0.026	0.613	-18	0	-3	0	0	-9	-109	-3	-6
Increase share of funds to Water Savings	0.044	0.128	0.152	0.027	0.009	0.026	0.613	-17	0	-2	0	0	-6	-78	-2	-4
Increase share of funds to Wind erosion	0.044	0.128	0.092	0.087	0.009	0.026	0.613	-5	0	-4	0	0	-11	-140	-4	-7
Increase share of funds to Non-waste nutrient	0.044	0.128	0.092	0.027	0.069	0.026	0.613	59	0	7	0	0	21	275	7	14
Increase share of funds to Wildlife Habitat	0.044	0.128	0.092	0.027	0.009	0.086	0.613	-1	0	-1	0	0	-4	-51	-1	-3

Allocation formula

Description

The allocation formula alternative is a continuation of the national allocation funding process at the state level. This alternative assumes that states would not grant funds to individual applications on a statewide evaluation process, but rather will allocate funds to individual counties, parishes, or other sub-state levels. These sub-state level workgroups would then be responsible for determining resource concerns, developing an evaluation process, and selecting applications to meet the local needs. The entire process would be something similar to the priority area designation, except each sub-state level would not be required to apply to be considered for funds. Following broad national guidance, each state would develop a funding allocation formula similar to that administered at the national level.

The national funding allocation process consists of a series of factors prioritized by significance to the national priorities. Data is collected from various sources such as NRI (Natural Resources Inventory), Census of Agriculture, US Census, etc., and plugged into this formula. The following table illustrates the factors, unit of measurement and prioritized weights used in the formula:

Historical National Funding Allocation Formula

FACTOR	UNITS	WEIGHT
Farm & Ranches	Number	2.040
Limited Resource Producers	Number	2.340
Federal Grazing Lands	Acres	0.250
Cropland	Acres	4.400
Cropland Erosion > T	Acres	6.600
Irrigated Cropland	Acres	4.220
Land in Specialty Crops	Acres	3.060
Non-Federal Grazing Lands	Acres	3.300
Pastureland Needing Treatment	Acres	5.330
Forest land	Acres	0.250
Other land in Farms	Acres	1.980
Water Bodies (<40 $ > 40 acres)	Acres	2.730
Wetlands	Acres	5.420
Fair and Poor Rangeland	Acres	3.620
Forest land Erosion > T	Acres	3.640
Land Subject to Flooding	Acres	1.880
Riparian Areas	Acres	4.460
Land with Saline or Alkaline Problems	Acres	2.600
Impaired Rivers & Streams	Miles	5.430
Coastal Zone Land	Sq. Mi.	3.300
Native American Tribal Lands	Acres	2.730
Potential Pesticide & Nitrate Runoff (ground water vulnerability)	Constant	2.625
Potential Pesticide & Nitrate Runoff (surface water vulnerability)	Constant	2.625
Animal Waste Generation	Tons	4.360
Waste Management System Capital Cost	Dollars	5.130
Livestock Animal Units	Animal Units	2.790
Livestock Animal Units/Cropland (animal waste disposal)	Animal Units	6.220
Population (millions)	Number	2.570
Commercial Fertilizer/Cropland	Acres	4.070

Additional factors could be considered in the allocation of funds. They could include:

1) Significance of the environmental and natural resource concern and the opportunity for encouraging environmental enhancement;
2) The need to optimize environmental benefits;

3) Improvements that NRCS expects will result from implementation of the conservation practices;
4) Expected number of producers who will participate and the time and financial commitment that the producers will provide;
5) The anticipated or proven performance of the partners involved in the proposal in delivering the program; and
6) Estimated program cost to provide technical, educational, and financial assistance;
7) The conservation needs of farmers and ranchers in complying with the highly erodible land and wetland conservation provisions of part 12 of this title and Federal, State, and tribal environmental laws;
8) Ways the program can best assist producers in complying with Federal, State, and tribal environmental laws, quantified where possible;
9) Level of coordination with and support from existing Federal, State, tribal, and local programs, including private sources, and both direct and in-kind contributions.

Comparison to NOFA/Proposed Rule

The allocation formula alternative may be the most broadly acceptable alternative discussed. It allows much decision making to occur at the local level, while at the same time maintains some level of state and national level control. The national funding allocation process should allocate funds to states that proportionately meet national goals, while the state allocation process should provide funding to local workgroups that proportionately meet state goals. This may not change the percentage of funded versus rejected applications; however, it should remove the gap between priority areas versus non-priority areas.

On the other hand, as discussed in the allocation by resource concern, decisions made due to political motives do not guarantee the optimization of benefits. However, due to the increased ability to provide direct funding to priority resource concerns, net benefits should be greater than the NOFA/Proposed Rule alternative.

Variable cost-share rates: addressing equity concerns

Description

There are many alternative cost-share rate scenarios that can be considered. Current NOFA guidelines on cost share state that the maximum direct program share of cost-share payments to a participant "shall not" be more than:

- 75 percent of the total cost of individual conservation practice that cost less than $100,000,
- 50 percent of the total cost of individual conservation practice that cost more than $100,000, or
- 90 percent of the total cost of the conservation practices for
    - new or beginning farmers, or
    - limited resource producers

Comparison to NOFA/Proposed Rule

Two options have been identified that could improve the rule, or to facilitate the intent of the rules. These options could be used with the EQIP large practices, or on the total EQIP contact.

Option 1, Modify the Rule to a marginal approach at $100,000.

This option is consistent with Sec. 1466.23(a)(5) of the proposed EQIP rule, which states:

"The maximum direct Federal share of cost-share payments to a participant for any single structural practice where the actual cost exceeds $100,000 shall not be more than 50 percent of the actual cost of the practice over $100,000."

This option will marginally adjust the cost share rate to 50% on the additional costs over $100,000. That eliminates most of the incentives for misreporting and achieves the purpose making EQIP available to more participants. There will be additional government costs of $25,000 for every $100,000 or above practice compared with the NOFA/Proposed Rule since every producer will receive $75,000 cost share on his/her first $100,000 of costs.

Option 2, Modify the Rule to a marginal approach at $100,000 and higher brackets.

This marginally adjusts the cost share rate to 50% for costs between $100,000 and $200,000; then 40% to $300,000; 30% at $200,000; 25% at $400,000; and 20% over $400,000 until it reaches the $450,000 limit. This method would produce more costs reductions than the current NOFA/Proposed Rule or option 1; producing these federal cost

reductions at the expense of both the middle and the large size producers. It is highly unlikely that many farms would need a single practice over $300,000, in fact only 917 farms total (.4%) are estimated to have total animal waste capital costs greater than $300,000.

Historically, EQIP limited contract cost to $50,000, therefore no data exists for practices over $100,000. Data does not exist that can estimate the impact of this rule on irrigation practices, however the NRCS CNMP Cost model could be used to estimate the impact on animal waste practices. The NRCS CNMP Cost model does not allow individual practice costs to be separated out, however an attempt was made to determine the proportion of animal waste operations that could be affected by this rule. The model allows for the separation of capital costs associated with manure and waste water storage and handling, which would account for the majority of animal waste practices that could reach the $100,000 threshold. Of this subset of farms that could reach the practice limitation threshold, it is unlikely that they would need only one practice in order to implement a CNMP. However, if they did, 1.5 %, or 3,944 of the AFOs, almost all farms with greater than 1000 animal units, could be affected by this limit. This can act as the upper bound estimate of number of farms that could be affected by the $100,000 cap on practice cost rule.

Holdback

Description

The holdback alternative is simply a supplement to the current national allocation procedures discussed previously. The national level would withhold a portion of funds from the initial allocation distributed to states. At a later date, secondary allocations would be distributed to states with evaluation procedures that meet certain requirements or exhibit items that help meet national goals. Possible factors could include a simplified ranking process; program efficiency indicators like an obligations to earnings ratio; or rewards to states that address national resource concerns.

A portion of the initial EQIP funding could be retained to issue to states that demonstrate a higher level of quality performance in achieving the purpose and national priorities. Factors that will be considered in the subsequent increased EQIP allocation includes the extent of: 1) environmental performance achieved by the approved contracts; 2) percentage of contracts with long lived cost-effective practices that benefit multiple resources; 3) the approved EQIP contracts have helped to maintain the economic value of agriculture; and/or 4) development quality of state level conservation plans.

Comparison to NOFA/Proposed Rule

Assuming that the secondary allocation would reward states with the most effective or efficient evaluation processes, the overall net benefits of this alternative should increase. The actual increase is dependent upon on the total amount withheld for secondary allocation, and the rating system used. This rating system would have the most potential for problems and/or criticisms, especially from states competing for those additional funds. Developing an evaluation system that would be equitable to all states, yet ensure that funds are allocated to states that would optimize environmental benefits becomes the major obstacle of this alternative.

Summary

The EQIP Benefit Cost Analysis compares the EQIP program created in 1996 (“old program”) with those changes associated with the 2002 program implemented through the Notice Of Fund Availability (NOFA). Additionally, several alternatives associated with the proposed rule were then compared with the NOFA.

Based upon this analysis, it is estimated that 63 million acres of agricultural land will be treated, categorized by 44 million acres of cropland, 10 million acres of grazing land, and 9 million acres for wildlife if the proposed program is implemented. This results in $6.8 billion in total benefits, including $3.6 billion due to animal waste treatment and $3.2 billion due to non-animal waste land treatments.

The treatment level is expected to increase when compared to the old EQIP. An additional 0.9 million acres for sheet and rill water erosion (USLE) reduction, 2.3 million acres for wind erosion, 8.5 million acres for non-waste nutrient management, 9.6 million acres for net irrigation water reduction, 3.1 million acres for grazing productivity, and 4.1 million acres for wildlife habitat will occur on the landscape. In addition, 4.8 million animal units, and 2,755 animal feeding operations will be treated, and total soil loss from agricultural land decreased by 7.5 million tons/year.

Under the assumption of the old program continuing at level funding, the benefit cost ratios were 2.2 relative to EQIP funds and 0.9 relative to total practice cost. The net present value of benefits over the period of 2002-07 were

estimated to be $2.2 billion with $0.3 billion coming from waste treatment and $1.9 billion from land treatment. Net benefits were $1.2 billion above EQIP funds and -$0.2 billion if total costs were accounted for.

The Benefit Cost (BC) ratios were smaller under the new program and were estimated to be 1.5 relative to EQIP funds and 1.0 relative to total cost. Net benefits were $2.3 billion above EQIP funds and $0.2 billion if total costs were accounted for. Under the old program, EQIP funds were 41 percent of total cost, but that share increases to 69 percent for the new program.

The difference between the net benefits estimates of the two scenarios is due to three factors:

- scale effect associated with increased funding;
- practice mix effect as a larger share of funds are allocated to livestock waste treatment; and
- cost effect, since with cost share buy down eliminated, the government cost per treated unit is most likely increased.

Neither the benefits for all practices, nor for all the benefits on practices for which some benefits could be accounted for, could be completely enumerated. Consequently, these benefit estimates should be considered as conservative lower bound estimates.

Practices for which land treatment benefits could be estimated were grouped according to category of benefit produced. The categories of benefits produced from non-livestock waste land treatment were:

- sheet and rill (USLE) water erosion reduction;
- animal waste management on animal feeding operations;
- enhanced forage production on grazing lands;
- increased irrigation water use efficiency;
- improved air quality through reduced wind erosion;
- reduced fertilizer expense through nutrient management not associated with animal waste; and
- benefits from improved wildlife habitat.

For livestock waste treatment, the specific practices producing environmental benefits were not individually identified. Instead, benefits were calculated based on the number of animal units treated.

Several alternatives were identified between the NOFA and the proposed program. These alternatives were categorized as:

- alternatives for funding confined animal feeding operations
- payment limitation alternatives
- alternatives for fund allocation and alternative application evaluation procedures. These alternatives included:
  - a homogeneous evaluation process: consists of identically scored criteria used to evaluate applications across an entire area
  - a spatial evaluation process: a process that would give extra weight to applications that would provide positive impacts to sensitive areas, proximity to protected or critical areas, or some location based criteria
  - evaluation by resource concern: evaluating on a specific resource concern, analogous to the 1996 EQIP state-wide resource concern evaluation process
  - variable cost share rates: vary cost share rates depending upon practice cost
  - allocation holdback alternative: this alternative assumes that some funds will be held back from initial state allocation and then allocated based upon performance criteria.

Alternative 1: Alternatives to AFO/CAFO Funding

Allocating based on share of total animal units (AUs) results in 42 percent of the funding going to the largest size class (>1000 AUs), and achieves the greatest net benefits of $2.03 billion and $1.02 billion for EQIP funds and total costs. Conversely, the allocation based on share in numbers of operations, the largest size class would only receive 4 percent of the funding and would achieve much lower net benefits of $378 million and $-315 million for EQIP funds and total costs. Clearly, some efficiencies are lost due to the fact that it costs more per animal unit to treat the smaller size class CAFOs than the large farms.

The strategy generating the highest net benefits (of the six alternatives evaluated) is to allocate the funds across the size classes according to their proportionate share in total number of AUs. That strategy would result in treatment of 15.8 million AUs, compared to as low as 9.4 million AUs for the strategy with the lowest net benefits (allocation divided evenly to the 3 smallest size classes and excluding funding to CAFOs.) The more that funds are shifted towards the larger AFOs, the larger the number of AUs treated, the lower the TA cost, and the greater the estimated benefits.

If farms with greater than 1000 animal units remained excluded from EQIP funding for animal waste practices, a total of 11,400 farms, with a total of 23 million animal units, and an overall need of $500 million in CNMP costs would remain ineligible for EQIP funding. In the scenario of not funding large CAFOs, this analysis shows that although the overall benefit cost ratio would still exceed 1, net benefits would be the lowest of all scenarios, with $314 million for EQIP funds and $421 million for total costs.

It could be expected that the between 17% (9.4 million) and 29% (15.8 million) of total animal units could be treated through the EQIP program.

Alternative 2: Payment Limits Between $50,000 and $450,000

Alternative 2 analyzes the effects of various payment limitations from $50,000 and the legislated maximum of $450,000.

Although the various payment limitations do not have great bearing on the total number of farms that would be affected by the caps, a significant number of animal units could be eligible for funding without payment limitations at the higher cap levels.

At the $450,000 payment limitation level, only 1% of the remaining livestock farms would still be capped in the costs of implementing animal waste conservation practices. However, those 1% farms control 27% of the animal units. These represent the biggest farms with the highest total costs, but lowest cost per animal unit.

Although there are relatively few additional farms that would be funded as payment limitations increase, these farms have a large number of animal units. In this case, between the $50,000 and $100,000 payment limitation schemes, the additional $50,000 would allow an additional 9 million animal units to be eligible for funding under the payment limitation. However between the $300,000 and $450,000 payment limitation schemes, the additional $150,000 (three times the increase) would only increase the number of animal units by fewer than 3 million, or one-third the increase.

At the $50,000 payment limitation, only 33% of the livestock farms' animal units would be eligible for funding without reaching the cap. At $100,000, half of the nation's animal units would qualify for EQIP funding without reaching the cap, and at the $450,000, almost three quarters of the nation's animal units would qualify for EQIP funding without reaching the payment limitation cap.

Although legislation allows a maximum payment of $450,000 per participant, it is assumed that the Agency and states may set lower limitations if necessary based on local market, cultural or economic conditions. However, based on this analysis, there is no economic gain associated with lower payment limitations. Since the larger farms represent those with the highest number of animal units and greatest cost efficiencies per animal unit, the program would benefit by allowing full participation of that sector.

Alternative 3: Alternative Application Evaluation Procedures to Ensure Cost-effective, Environmentally-targeted Fund Allocation

The NOFA/Proposed Rule alternative eliminates the process of designating funds to conservation priority areas, removes the buy-down provision and an offer index that has cost factor as a denominator in EQIP. States have the flexibility to develop a funding allocation procedure to best fit the needs of the state. There is some concern that this will have a negative impact on the potential environmental benefits due to the fact that funds may not be targeted to specific geographic areas, and the environmental effects of practice implementation will be diluted by scattering cost share assistance over a much broader area. Six different alternatives to priority area designation are identified and the potential impacts to the program were analyzed:

- Homogeneous evaluation process (NOFA/Proposed Rule)
- Spatial evaluation process
- Allocation and evaluation by Resource Concern
- Variable cost share rates
- Allocation formula
- Holdback

Utilizing a spatial evaluation process, targeting resource concerns through varying cost share rates, and locally allocating funds relative to resource concern can all provide useful tools that can increase net benefits and ensure cost-effective, environmentally targeted fund allocation.

The analysis suggests that modifying the NOFA guidance for cost-sharing for practices above $100,000 shall be 50% of the actual cost of the practice over $100,000 would eliminate many disincentives while still achieving the purpose of making EQIP available to more participants.

Both the national allocation formula based upon a series of factors prioritized by significance to the national priorities, and a holdback of funds for distribution based upon performance criteria can be useful tools that could increase net benefits and increase program efficiency.

Based on an analysis of several methods of distributing funds for optimization of environmental benefits, net benefits would be greatest using a scenario where applications are ranked using some form of spatial evaluation process. This will ensure that environmental benefits are maximized and program objectives are met, but would not exclude participation by persons outside of a designated boundary. Data suggests that in spite of the removal of the priority area requirement, the Environmental Quality Incentives Program can still be targeted to reach the most critical natural resource concerns. Since states have flexibility to determine environmental ranking procedures at the local level, the most realistic allocation scenario would be some combination of the options in Alternative 3.

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Appendix 1. Historical EQIP Data

Table A1-1. Historical EQIP Practices Contracted and Installed

Practice Code and Name			Units	Approved			Implemented			Total Cost
				Number Contracts	Number Units	Cost Share	Number Contracts	Number Units	Cost Share	
313		Waste Storage Facility	NO.	7,746	7,480,224	79,657,098	3573	3,389,226	37,475,709	94,509,948
382		Fence	FT	34,095	106,459,403	52,126,285	11907	37,298,292	18,092,862	51,812,234
442		Irrigation System Sprinkler	NO. AND AC, Sprinkler	6,361	2,114,925	35,486,577	3033	1,098,293	21,333,028	51,316,580
512		Pasture and Hay Planting	AC	29,687	1,628,256	33,796,511	12034	561,951	13,777,560	30,255,077
590		Nutrient Management	AC	192,541	25,413,716	30,734,662	42674	6,344,599	12,941,470	26,718,974
516		Pipeline	FT	17,351	44,727,152	29,687,147	7299	20,732,486	13,346,422	71,948,208
430	DD	Irrigation Water Conveyance Pipeline, High-Pressure	FT	7,358	15,815,978	28,287,002	3786	8,786,355	14,804,144	35,659,902
314		Brush Management	AC	19,931	2,233,018	27,002,129	7055	738,986	11,053,384	37,565,149
410		Grade Stabilization Structure	NO.	10,791	2,090,081	23,735,754	4939	1,013,657	10,484,268	27,134,504
378		Pond	NO.	10,298	11,035,065	23,423,802	5164	5,788,294	11,866,434	31,195,258
312		Waste Management System	NO.	5,414	1,655,331	23,299,813	1306	801,771	9,855,438	31,216,227
329	A	Residue Management, No-Till and Strip Till	AC	29,828	2,549,677	18,826,296	8892	752,584	8,034,476	14,953,683
600		Terrace1	FT	9,878	84,207,035	18,291,508	4141	31,097,369	8,410,459	21,690,701
614		Trough or Tank	NO.	24,449	15,532,432	18,189,413	9097	6,887,951	6,814,304	27,596,069
430	EE	Irrigation Water Conveyance Pipeline, Low-Pressure,	FT	3,905	11,655,732	17,274,490	2060	6,151,719	9,556,878	26,277,786
595		Pest Management1	AC	136,517	19,004,700	15,412,582	28120	3,103,973	6,748,300	14,853,269
528	A	Prescribed Grazing	AC	133,063	91,771,580	15,030,305	27980	13,472,948	7,421,948	16,923,590
561		Heavy Use Area Protection	AC	10,580	2,463,861	13,656,623	2914	1,254,078	5,848,296	12,579,539
412		Grassed Waterway	AC	10,743	3,424,746	13,147,345	4597	1,239,988	6,360,695	13,566,131
464		Irrigation Land Leveling	AC	3,262	16,276,194	12,051,027	1383	8,525,985	5,473,679	13,859,306
587		Structure for Water Control	NO.	6,986	1,348,926	11,712,368	2932	607,867	4,451,866	11,003,307
441		Irrigation System Microirrigation	NO. AND AC	2,104	3,816,732	11,444,309	853	1,162,083	5,770,473	22,464,719
642		Water Well	NO.	5,350	621,002	11,330,995	2563	271,640	5,316,978	13,517,259
317		Composting Facility	NO.	2,167	605,637	11,303,647	1276	352,539	6,648,178	14,414,433
638		Water and Sediment Control Basin	NO.	3,891	936,227	10,174,970	1634	349,942	4,008,111	8,960,590
580		Streambank and Shoreline Protection	FT	3,057	3,651,616	9,043,292	941	983,068	3,249,540	7,441,466
633		Waste Utilization	AC	26,478	19,903,950	8,830,108	6342	7,648,658	3,493,085	6,610,274
430	HH	Irrigation Water Conveyance Pipeline, Rigid Gated P	FT	2,998	7,544,620	7,718,745	1531	4,533,318	3,811,504	10,234,957
620		Underground Outlet	FT	4,710	4,118,998	7,391,505	2193	2,019,636	3,426,990	9,127,588
342		Critical Area Planting1	AC	12,849	425,935	6,588,314	4618	177,384	2,685,059	25,361,525
428	A	Irrigation Water Conveyance Ditch and Canal Lining1	FT	954	1,358,793	6,396,408	534	710,555	3,812,972	17,022,515
329	B	Residue Management, Mulch Till	AC	17,815	2,895,192	5,972,819	4286	709,397	2,732,861	4,699,092
550		Range Planting	AC	4,943	417,877	5,611,698	1607	120,624	1,564,645	2,999,409
533		Pumping Plant for Water Control	NO.	1,949	170,904	4,897,766	791	96,236	2,294,511	6,066,558

Practice Code	and Name	Units	Approved Number Contracts	Approved Number Units	Approved Cost Share	Implemented Number Contracts	Implemented Number Units	Implemented Cost Share	Total Cost
606	Subsurface Drain	FT	2,111	5,160,781	4,618,140	1001	2,853,227	2,385,431	5,497,637
362	Diversion	FT	4,086	4,593,314	4,470,097	1567	1,754,263	1,637,210	3,449,796
612	Tree/Shrub Establishment	AC	4,423	1,668,399	4,296,547	1542	891,171	1,614,216	3,474,921
380	Windbreak/Shelterbelt Establishment	FT	4,776	10,520,008	4,265,777	1888	4,347,126	1,445,988	2,677,947
574	Spring Development	NO.	3,847	52,482	4,244,140	1490	15,735	1,480,194	4,610,798
340	Cover Crop	AC	13,151	777,327	3,777,254	2791	145,096	1,345,112	4,889,644
558	Roof Runoff Management	NO.	2,175	230,400	3,646,890	618	74,567	1,090,198	2,205,559
449	Irrigation Water Management	AC	46,167	6,158,377	3,459,929	6509	1,037,935	1,540,054	3,954,249
998	Interim Closure of Abandoned Waste Treatment Lagoons	No	412	24,434	3,386,379	177	17,684	1,709,456	2,750,014
328	Conservation Crop Rotation	AC	89,139	13,436,125	3,370,572	15725	2,289,375	1,767,221	2,929,007
560	Access Road	FT	1,720	3,242,951	3,177,494	527	497,019	1,137,555	2,054,010
350	Sediment Basin	NO.	1,377	274,458	3,029,943	490	117,857	1,337,706	4,734,139
634	Manure Transfer	NO	749	108,803	2,681,400	230	31,915	1,108,900	2,205,118
447	Irrigation System, Tailwater Recovery	NO.	625	1,762,769	2,667,454	197	1,025,653	1,243,479	10,881,891
359	Waste Treatment Lagoon	NO.	311	1,357,433	2,445,601	139	916,113	1,289,793	3,370,294
645	Upland Wildlife Habitat Management	AC	59,787	38,615,102	2,444,495	10701	5,053,877	957,803	2,359,986
666	Forest Stand Improvement	AC	4,841	302,133	2,128,501	759	34,655	544,410	1,197,087
575	Animal Trails and Walkways	AC	1,168	693,612	1,864,507	445	304,710	727,051	1,127,536
705	Air Management	ac.	4,051	565,146	1,799,593	378	12,467	429,597	885,214
443	Irrigation System Surface and Subsurface	NO. AND AC	3,108	8,388,224	1,762,810	849	4,008,145	937,008	2,432,310
702	Agrochemical Mixing Facility	no.	122	27,875	1,627,661	22	56	320,731	1,111,409
344	Residue Management, Seasonal	AC	54,571	8,231,184	1,484,099	10526	1,398,026	835,521	3,261,113
393	Filter Strip1	AC	5,470	266,446	1,305,333	916	55,855	313,326	542,999
436	Irrigation Storage Reservoir	NO. AND AC-FT	187	2,613,186	1,272,561	95	1,498,050	715,371	2,261,284
657	Wetland Restoration	AC	457	101,367	1,258,953	126	9,409	460,075	1,594,337
338	Prescribed Burning	AC	3,322	768,820	1,170,328	614	133,406	234,302	359,879
707	Barnyard Runoff Management	no	363	5,205	1,093,937	53	116	252,919	377,827
751	Integrated Crop Management System-(ac.)2	ac.	3,638	314,036	1,072,090	1092	74,803	467,773	1,847,376
472	Use Exclusion	AC	10,432	955,917	1,013,697	1744	223,507	375,976	1,540,034
466	Land Smoothing	AC	556	175,259	995,004	176	56,539	399,721	938,839
468	Lined Waterway or Outlet	FT	355	111,430	986,548	145	32,329	375,274	921,166
571	Soil Salinity Management-Nonirrigated	AC	719	81,507	952,126	93	10,203	104,615	140,856
490	Forest Site Preparation	AC	1,179	61,501	916,721	512	15,651	495,983	1,219,488
386	Field Border	FT	3,668	14,668,441	833,822	893	2,987,950	292,900	414,942
500	Obstruction Removal	AC	328	65,242	828,749	160	46,202	413,656	597,183
425	Waste Storage Ponds	NO.	93	147,486	789,295	33	13,337	305,794	602,767
757	Animal Use Area Protection	ac.	356	326,824	785,022	190	203,678	427,576	907,296
650	Windbreak/Shelterbelt Renovation	FT	663	1,633,870	736,379	258	519,725	244,583	398,367
351	Well Decommissioning	NO	942	23,153	693,049	384	7,944	235,298	685,056
610	Toxic Salt Reduction	AC	463	63,111	645,070	174	19,417	317,510	461,923
327	Conservation Cover1	AC	3,706	294,805	640,065	764	60,603	177,324	342,513

Practice Code and Name			Units	Approved Number Contracts	Approved Number Units	Approved Cost Share	Implemented Number Contracts	Implemented Number Units	Implemented Cost Share	Total Cost
552	A	Irrigation Pit	NO.	132	836,405	566,746	69	445,528	263,687	823,398
484		Mulching	AC	1,008	987,153	551,022	390	485,098	265,466	2,828,977
728		Stream Crossing	no.	403	14,588	512,711	137	5,714	176,833	299,920
335		Controlled Drainage	AC	177	11,827	462,752	19	2,675	54,259	87,889
395		Fish Stream Improvement	FT	158	122,454	412,083	47	22,818	104,853	291,613
391		Riparian Forest Buffer1	AC	4,040	203,975	410,637	599	56,003	124,289	191,489
584		Stream Channel Stabilization	FT	181	48,216	408,477	48	17,246	113,243	170,173
408		Forest Land Erosion Control System	AC	135	93,925	380,991	78	70,059	185,361	266,885
644		Wetland Wildlife Habitat Management	AC	8,340	970,136	364,580	1152	141,850	166,132	321,395
393	A	Filter Strip2	AC	394	57,989	348,953	100	34,610	88,692	122,740
462		Precision Land Forming	AC	112	351,100	324,875	34	248,861	178,833	379,716
348		Dam, Diversion	NO.	69	57,791	305,289	23	26,144	74,963	121,854
356		Dike	FT	130	286,978	304,521	50	149,323	125,078	226,662
330		Contour Farming	AC	13,724	2,034,659	302,132	3514	392,319	164,729	191,882
324		Chiseling and Subsoiling	AC	613	82,559	301,334	133	12,405	111,083	211,387
552	B	Irrigation Regulating Reservoir	NO.	80	298,208	299,448	35	107,777	168,995	1,404,015
762		Planned Grazing System	ac.	2,302	3,177,840	288,958	509	746,068	126,288	187,655
655		Forest Harvest Trails and Landings	AC	320	140,637	277,451	77	12,914	87,734	202,070
349		Dam, Multiple-Purpose	NO. AND AC-FT	67	40,844	256,690	26	12,824	94,412	254,027
769		Incinerator	no.	93	1,536	255,987	32	1,472	94,166	153,545
430	CC	Irrigation Water Conveyance Pipeline, Nonreinforced	FT	37	67,797	249,748	15	27,653	97,307	159,404
388		Irrigation Field Ditch	FT	185	531,332	249,101	56	152,577	82,263	141,224
648		Wildlife Watering Facility	NO.	302	128,262	247,635	111	108,081	109,088	173,821
430	AA	Irrigation Water Conveyance Pipeline, Aluminum Tubi	FT	78	105,668	242,431	28	35,571	102,647	206,665
521	C	Pond Sealing or Lining Bentonite Sealant	NO.	124	515,151	242,067	38	289,979	96,167	170,850
548		Grazing Land Mechanical Treatment	AC	458	147,468	238,444	93	113,896	64,484	89,600
360		Closure of Waste Impoundments	NO	24	65	236,957	8	10	71,766	100,493
423		Hillside Ditch	FT	626	1,890,480	235,679	53	185,167	21,305	32,679
322		Channel Vegetation	AC	210	59,046	233,803	32	7,572	14,912	43,479
329	C	Residue Management, Ridge Till	AC	1,294	151,645	231,111	221	19,050	127,302	156,033
719		Milking Center Wastewater Treatment System	no.	50	50	223,117	14	14	44,366	73,496
636		Water Harvesting Catchment	NO.	59	5,846	221,758	9	23	29,432	52,095
422		Hedgerow Planting	FT	385	749,969	216,182	54	103,197	28,597	563,364
585		Contour Stripcropping	AC	567	37,175	214,194	148	9,482	63,888	99,574
586		Stripcropping	AC, Field	304	24,599	200,474	68	5,047	82,294	116,475
394		Firebreak	FT	712	4,021,278	198,445	154	581,001	73,828	158,703
521	A	Pond Sealing or Lining Flexible Membrane	NO.	30	310,275	194,035	10	73,224	96,602	147,947
716		Anion Polyacrylamide (PAM) Erosion Control-(ac.)	ac.	238	23,333	178,408	81	8,331	94,952	152,688
510		Pasture and Hayland Management	AC	10,805	1,215,627	167,781	2315	249,205	49,616	64,102
701		Agricultural Fuel Containment Facility	no.	40	41	163,752	6	6	23,361	37,958
748		Record Keeping	no.	7,037	725,479	137,117	2040	197,917	44,778	51,945

Practice Code		and Name	Units	Approved Number Contracts	Approved Number Units	Approved Cost Share	Implemented Number Contracts	Implemented Number Units	Implemented Cost Share	Total Cost
392		Field Windbreak	FT	207	579,940	136,832	31	81,675	26,718	36,969
630		Vertical Drain	NO.	142	21,299	130,472	68	20,239	47,851	105,205
640		Waterspreading	AC	64	75,901	111,095	20	33,876	42,788	88,081
749		Waste Field Storage Area	no.	203	14,371	100,873	36	2,359	5,515	8,776
660		Tree/Shrub Pruning1	AC	148	43,827	100,356	20	3,255	15,057	25,604
430	FF	Irrigation Water Conveyance Pipeline, Steel	FT	180	28,786	98,536	62	8,809	40,602	117,901
554		Regulating Water in Drainage Systems	AC	458	7,551	94,954	36	539	6,783	9,374
326		Clearing and Snagging	FT	43	68,072	92,221	22	44,781	38,149	67,939
582		Open Channel	FT	27	54,129	83,416	10	5,555	11,022	18,796
460		Land Clearing	AC	51	2,014	78,667	12	442	43,459	98,979
320		Irrigation Canal or Lateral	FT	45	127,583	75,910	15	63,614	25,552	50,316
521	E	Pond Sealing or Lining Asphalt-Sealed Fabric Liner	NO.	18	20	68,322	2	3	13,849	14,796
332		Contour Buffer Strips	AC	140	3,815	59,687	32	1,671	27,560	30,940
609		Surface Roughening	AC	4,735	1,321,736	55,281	878	266,676	31,928	55,243
731		Well Testing	no.	520	1,307	47,323	198	222	18,542	20,663
311		Alley Cropping	AC	397	1,485	47,033				
521	D	Pond Sealing or Lining Cationic Emulsion-Waterborne	NO.	13	512	44,335	3	3	19,786	26,754
428	B	Irrigation Water Conveyance Ditch and Canal Lining2	FT	10	65,080	40,827	3	38,338	14,014	23,882
589	B	Cross Wind Stripcropping	AC	494	73,175	38,029	110	13,098	15,788	21,635
607		Surface Drainage Field Ditch	FT	129	736,775	36,658	24	49,960	10,014	19,717
744		Land Grading	ac.	15	4,310	32,284	4	2,074	19,432	43,437
342	A	Critical Area Planting2	AC	45	27,717	31,597	8	13	5,169	8,911
730		Watering Ramp for Cattle	no.	46	2,127	29,652	14	16	8,080	17,822
521	B	Pond Sealing or Lining Soil Dispersant	NO.	16	2,360	27,627	9	2,347	4,183	8,733
402		Dam, Floodwater Retarding	NO. AND AC-FT	15	608	24,457				
608		Surface Drainage Main or Lateral	FT	62	209,190	24,148	19	15,745	16,958	43,973
331		Contour Orchard and Other Fruit Area	AC	298	1,294	23,421	23	150	3,309	5,741
557		Row Arrangement	AC	336	25,728	22,408	59	11,149	7,481	11,235
738		Soil Salinity Control	ac.	110	31,731	21,927	12	1,205	9,944	21,787
739		Hillside Bench	ac.	5	61	20,196	1	0	263	658
746		Rice Water Control	ac.	97	7,183	19,987	31	1,778	10,463	10,629
734		Vegetative Barrier-(ft.)	ac.	66	80,022	18,130	2	8,682	2,008	2,809
555		Rock Barrier	FT	14	11,810	17,008				
428	C	Irrigation Water Conveyance Ditch and Canal Lining3	FT	8	16,356	16,894	3	6,622	5,950	12,883
647		Early Successional Habitat Development/Management	AC	259	1,849	16,780	13	83	7,911	8,503
725		Sinkhole and Sinkhole Area Treatment	no.	34	45	16,203	9	11	1,203	1,604
422	A	Herbaceous Wind Barriers	FT	45	285,658	15,202				
511		Forage Harvest Management	AC	9,577	1,193,994	14,920	1044	99,585	4,592	5,465
658		Wetland Creation	AC	10	3,175	14,303				
704		Agroforestry Planting	ac.	5	518	13,384	1	40	6,620	8,826
745		Stream Corridore Improvement	ft.	10	11,817	12,741				

Practice Code		and Name	Units	Approved Number Contracts	Approved Number Units	Approved Cost Share	Implemented Number Contracts	Implemented Number Units	Implemented Cost Share	Total Cost
743		Improved Water Application	ac.	542	43,344	12,380				
659		Wetland Enhancement	AC	7	510	11,371				
589	C	Cross Wind Trap Strips	AC	85	11,563	10,910	25	2,134	4,765	6,548
720		Pollution Retention Reservoir	no.	6	3,920	10,780	4	4	5,399	20,647
643		Restoration and Management of Declining Habitats	AC	27	21,757	9,750	2	20	2,649	10,246
758		Strip - Intercropping	ac.	5	851	9,672	5	851	9,672	9,672
327	A	Conservation Cover2	AC	43	1,464	8,107	11	432	3,703	5,247
404		Floodway	FT	4	9,532	8,095	3	9,412	7,447	14,992
646		Shallow Water Management for Wildlife	AC	26	7,733	6,702	1	20	0	0
390		Riparian Herbaceous Cover	AC	125	22,113	6,162	7	28	0	0
572		Spoil Spreading	FT	13	4,824	5,683	9	2,963	5,012	7,379
430	GG	Irrigation Water Conveyance Pipeline, Reinforced Pl	FT	2	4,250	4,560	1	2,400	405	540
641		Water Table Control	AC	29	3,138	4,247	2	150	1,500	1,500
400		Floodwater Diversion	FT	2	2	3,750				
759		Riparian Buffers - Vegetative	ac.	15	482	3,347	3	82	0	0
589	A	Cross Wind Ridges	AC	42	6,674	1,721	12	3,052	1,721	2,293
432		Dry Hydrant	Each	5	11	1,530	2	5	580	1,163
600	SP	Terrace2	FT	1	2,788	1,522				
722		Road/Landing Removal	ac.	1	1	1,500				
399		Fishpond Management	NO.	665	2,067	1,433	105	142	900	1,926
741		Vegetative Buffer Strips	ac.	6	8	1,140	2	5	396	396
703		Agrochemical Mixing Station, Portable	no.	1	1	1,125				
724		Roof Runoff Management2	ft.2	1	288	1,106				
747		Root Plowing	ac.	16	56,100	607	2	4,740	25	25
482		Mole Drain	FT	15	460	598	5	127	165	10,213
727		Snow Harvesting	ac.	1	192	576	1	192	576	1,169
532		Pumped Well Drain	NO.	2	2	525	1	1	300	872
753		Infiltration Ditches	ft.	2	46	265				
752		Farm*A*Syst Evaluation	no.	148	286	98	23	24	98	98
310		Bedding	AC	7	250	0				
733		Cross Slope Farming	ac.	44	2,011	0	2	144	0	0
763		Woodland Pruning	ac.	5	56	0				
		Totals		1,216,696	670,105,513	746,132,579	306,736	217,549,094	331,263,044	912,449,037

Table A1-2. Historical EQIP Cost Share Rates for Structural and Management Practices by State and Region. 1997-2001

EQIP Installed Practices, 1997-2001

Non-cost shared, contracted practices NOT included

		Structural Practices (eligible for up to 75% cost share rate)				Management Practices (eligible for up to 100% incentive payment rate)				Total			
Region	**State**	**Total Cost Share Paid ($)**	**Reported Total Installation Cost[1] ($)**	**Difference ($)**	**Estimated Cost-share %**	**Total Cost Share Paid ($)**	**Reported Total Installation Cost[1] ($)**	**Difference ($)**	**Estimated Cost-share %**	**Total Cost Share Paid ($)**	**Reported Total Installation Cost[1] ($)**	**Difference ($)**	**Estimated Cost-share %**
East	Connecticut	341,251	689,705	348,454	49%	418,736	514,675	95,939	81%	759,987	1,204,380	444,393	63%
	Delaware	1,603,001	2,544,949	941,948	63%	519,192	634,687	115,495	82%	2,122,193	3,179,636	1,057,443	67%
	Massachucetts	743,087	1,370,692	627,605	54%	87,382	198,483	111,101	44%	830,469	1,569,175	738,706	53%
	Maryland	2,023,319	4,336,646	2,313,327	47%	1,227,410	1,413,929	186,519	87%	3,250,729	5,750,575	2,499,846	57%
	Maine	2,665,739	4,601,302	1,935,563	58%	549,565	1,836,285	1,286,720	30%	3,215,304	6,437,587	3,222,283	50%
	New Hampshire	838,522	5,382,234	4,543,712	16%	49,130	53,951	4,821	91%	887,652	5,436,185	4,548,533	16%
	New Jersey	882,461	2,810,368	1,927,907	31%	142,810	1,718,206	1,575,396	8%	1,025,271	4,528,574	3,503,303	23%
	New York	4,348,282	8,865,913	4,517,631	49%	1,350,021	1,613,207	263,186	84%	5,698,303	10,479,120	4,780,817	54%
	Pennsylvania	6,072,680	18,317,638	12,244,958	33%	172,660	298,563	125,903	58%	6,245,340	18,616,201	12,370,861	34%
	Rhode Island	164,960	322,464	157,504	51%	6,664	8,282	1,618	80%	171,624	330,746	159,122	52%
	Vermont	2,126,526	4,501,269	2,374,743	47%	239,296	1,269,668	1,030,372	19%	2,365,822	5,770,937	3,405,115	41%
	West Virginia	1,968,772	3,790,056	1,821,284	52%	1,491,031	1,688,896	197,865	88%	3,459,803	5,478,952	2,019,149	63%
Total for East Region:		**23,778,600**	**57,533,236**	**33,754,636**	**41%**	**6,253,897**	**11,248,832**	**4,994,935**	**56%**	**30,032,497**	**68,782,068**	**38,749,571**	**44%**
Midwest	Iowa	6,550,288	21,778,396	15,228,108	30%	2,847,154	7,492,619	4,645,465	38%	9,397,442	29,271,015	19,873,573	32%
	Illinois	7,001,401	14,246,522	7,245,121	49%	845,933	1,072,732	226,799	79%	7,847,334	15,319,254	7,471,920	51%
	Indiana	4,364,537	8,273,018	3,908,481	53%	1,247,181	1,514,162	266,981	82%	5,611,718	9,787,180	4,175,462	57%
	Michigan	5,170,126	11,515,883	6,345,757	45%	1,739,189	3,621,224	1,882,035	48%	6,909,315	15,137,107	8,227,792	46%
	Minnesota	7,510,907	12,446,609	4,935,702	60%	894,174	1,523,259	629,085	59%	8,405,081	13,969,868	5,564,787	60%
	Missouri	5,819,582	10,246,315	4,426,733	57%	2,940,665	4,400,536	1,459,871	67%	8,760,247	14,646,851	5,886,604	60%
	Ohio	4,514,993	10,857,547	6,342,554	42%	1,040,294	5,374,188	4,333,894	19%	5,555,287	16,231,735	10,676,448	34%
	Wisconsin	4,801,740	34,561,623	29,759,883	14%	1,625,324	2,957,409	1,332,085	55%	6,427,064	37,519,032	31,091,968	17%
Total for Midwest Region:		**45,733,574**	**123,925,913**	**78,192,339**	**37%**	**13,179,914**	**27,956,129**	**14,776,215**	**47%**	**58,913,488**	**151,882,042**	**92,968,554**	**39%**
Northern Plains	Colorado	13,739,166	29,169,553	15,430,387	47%	558,700	1,079,426	520,726	52%	14,297,866	30,248,979	15,951,113	47%
	Kansas	4,561,944	10,626,340	6,064,396	43%	4,777,900	10,318,095	5,540,195	46%	9,339,844	20,944,435	11,604,591	45%
	Montana	10,844,961	22,720,487	11,875,526	48%	355,045	565,977	210,932	63%	11,200,006	23,286,464	12,086,458	48%
	North Dakota	4,734,536	7,527,610	2,793,074	63%	1,561,991	3,331,920	1,769,929	47%	6,296,527	10,859,530	4,563,003	58%
	Nebraska	8,093,873	82,142,746	74,048,873	10%	922,000	9,919,767	8,997,767	9%	9,015,873	92,062,513	83,046,640	10%

	South Dakota	6,156,810	11,640,495	5,483,685	53%	64,678	92,654	27,976	70%	6,221,488	11,733,149	5,511,661	53%
	Wyoming	6,693,852	14,689,991	7,996,139	46%	346,556	553,609	207,053	63%	7,040,408	15,243,600	8,203,192	46%
Total for Northern Plains Region:		**54,825,142**	**178,517,222**	**123,692,080**	**31%**	**8,586,870**	**25,861,448**	**17,274,578**	**33%**	**63,412,012**	**204,378,670**	**140,966,658**	**31%**
South Central	Arkansas	8,888,640	30,359,498	21,470,858	29%	888,523	1,391,492	502,969	64%	9,777,163	31,750,990	21,973,827	31%
	Louisiana	5,669,136	30,043,403	24,374,267	19%	2,279,893	5,590,337	3,310,444	41%	7,949,029	35,633,740	27,684,711	22%
	Oklahoma	5,567,005	10,912,584	5,345,579	51%	1,733,185	3,459,661	1,726,476	50%	7,300,190	14,372,245	7,072,055	51%
	Texas	19,317,370	55,040,557	35,723,187	35%	6,931,842	21,593,927	14,662,085	32%	26,249,212	76,634,484	50,385,272	34%
Total for South Central Region:		**39,442,151**	**126,356,042**	**86,913,891**	**31%**	**11,833,443**	**32,035,417**	**20,201,974**	**37%**	**51,275,594**	**158,391,459**	**107,115,865**	**32%**
Southeast	Alabama	6,903,657	17,504,721	10,601,064	39%	836,432	1,839,684	1,003,252	45%	7,740,089	19,344,405	11,604,316	40%
	Florida	7,067,307	13,668,664	6,601,357	52%	1,237,699	3,503,284	2,265,585	35%	8,305,006	17,171,948	8,866,942	48%
	Georgia	4,199,154	12,373,420	8,174,266	34%	3,376,025	7,579,933	4,203,908	45%	7,575,179	19,953,353	12,378,174	38%
	Kentucky	5,212,562	10,854,389	5,641,827	48%	397,148	1,297,695	900,547	31%	5,609,710	12,152,084	6,542,374	46%
	Mississippi	10,907,367	24,518,634	13,611,267	44%	597,698	1,388,513	790,815	43%	11,505,065	25,907,147	14,402,082	44%
	North Carolina	6,675,503	14,959,649	8,284,146	45%	2,563,807	5,429,020	2,865,213	47%	9,239,310	20,388,669	11,149,359	45%
	South Carolina	4,097,586	13,908,571	9,810,985	29%	1,322,834	2,625,618	1,302,784	50%	5,420,420	16,534,189	11,113,769	33%
	Tennessee	5,632,586	10,123,492	4,490,906	56%	37,380	51,036	13,656	73%	5,669,966	10,174,528	4,504,562	56%
	Virginia	5,213,584	12,611,248	7,397,664	41%	149,223	223,719	74,496	67%	5,362,807	12,834,967	7,472,160	42%
Total for Southeast Region:		**55,909,306**	**130,522,788**	**74,613,482**	**43%**	**10,518,246**	**23,938,502**	**13,420,256**	**44%**	**66,427,552**	**154,461,290**	**88,033,738**	**43%**
West	Arizona	7,361,822	13,474,808	6,112,986	1307%	563,274	796,888	233,614	71%	7,925,096	14,271,696	6,346,600	56%
	California	10,007,340	54,671,734	44,664,394	18%	1,400,557	2,799,256	1,398,699	50%	11,407,897	57,470,990	46,063,093	20%
	Idaho	6,478,580	23,555,927	17,077,347	28%	425,004	602,771	177,767	71%	6,903,584	24,158,698	17,255,114	29%
	New Mexico	5,404,515	18,615,342	13,210,827	29%	1,735,487	4,495,452	2,759,965	39%	7,140,002	23,110,794	15,970,792	31%
	Nevada	1,677,981	3,693,214	2,015,233	45%	56,527	112,829	56,302	50%	1,734,508	3,806,043	2,071,535	46%
	Oregon	3,982,589	8,036,355	4,053,766	50%	1,528,162	2,874,069	1,345,907	53%	5,510,751	10,910,424	5,399,673	51%
	Utah	8,623,943	14,817,781	6,193,838	58%	522,199	799,475	277,276	65%	9,146,142	15,617,256	6,471,114	59%
	Washington	6,628,434	15,877,763	9,249,329	42%	1,979,432	3,302,652	1,323,220	60%	8,607,866	19,180,415	10,572,549	45%
Total for West Region:		**50,165,204**	**152,742,924**	**102,577,720**	**33%**	**8,210,642**	**15,783,392**	**7,572,750**	**52%**	**58,375,846**	**168,526,316**	**110,150,470**	**35%**
	TOTAL U.S.:	**269,853,977**	**769,598,125**	**499,744,148**	**35%**	**58,583,012**	**136,823,720**	**78,240,708**	**43%**	**328,436,989**	**906,421,845**	**577,984,856**	**36%**

[1]Installation costs for non-cost-shared practices were not reported, therefore 0% cost shared practices were excluded from this analysis because it would skew the results.

Appendix 2. Analysis of Soil Erosion Concerns and EQIP Priority Areas.

This analysis looks at the potential impact of eliminating EQIP priority areas to reducing soil erosion concerns. In the 1996 to 2002 EQIP program, there were $62,746,011 EQIP cost share dollars used to protect 886,706 acres from USLE erosion. The former EQIP program records an average reduction of 8.6 tons per acre, based on ERS estimates. Under the new EQIP program, this analysis estimates of 3,431,131 acres to be treated for erosion reduction at an EQIP cost of $257,171,161 and a total cost of $320,606,714. The question is: should these dollars be pointed toward specific priority areas and then ranked by the current erosion on fields within these areas; or should these dollars be pointed to the highest eroding fields on a national or statewide ranking system?

The Natural Resources Inventory (NRI) has measured erosion on 190,614 points on cultivated cropland, of which 64,294 points are in EQIP priority areas. With the EQIP ranking procedures, if erosion is a resource priority, the most erosive points should be the fields qualifying for an EQIP contact. The 1997 NRI shows 326,783,700 acres of cultivated cropland, 50,214,000 acres of uncultivated cropland and 32,696,000 acres of CRP land. Table 9 shows the national distribution of erosion rates.

This EQIP Cost Benefit analysis predicts 3,431,131 acres of cropland could be treated with the new program between 2002 and 2007. So the new program should treat roughly 1% of all cropland for erosion control. We considered three possibilities of prioritizing where this erosion control will occur.

- The new EQIP program will have a two-step ranking procedure. Erosion is included as a factor in the allocation formula sending funds to the states. Erosion is then included in most state application rankings. Thus the new program will allocate most of the erosion control practices to those fields needing it most. We assume the two-step procedures functions as a single function.
- The prior rules allocated at almost 73% of the funds into the 1,400 EQIP priority areas. As a simplification, we look at all erosion reducing practices going into EQIP priority areas.
- Funding inside the individual EQIP priority areas was targeted to one or two major resource priority concerns. There are 22,756,000 acres of cultivated cropland within EQIP priority areas with a major concern of Soil Erosion. This represents the most concentrated targeting of funds toward erosion concerns within the old Priority Area EQIP rules.

This analysis tests two questions:

- How much erosion control can we achieve by treating the worse 1% of cultivated cropland, 3,263,000 acres?
- Assuming we can get 25% signups, how much if we treat the worse 4% of cropland, 13,055,000 acres? This is four times the estimated amount that could be treated in the new program, but the average erosion rate is closer to the future EQIP program average.

Table A2-1 below shows the results of this analysis. The more limiting the area considered, the lower the average erosion of the worse acreage. With the most eroding one percent of cropland, the average erosion rates drops from 27 ton/ac/year to 16.9 if limited to the current EQIP priority areas, and down to 12.8 tons/ac/year if limited to only priority areas whose primary resource concern is soil erosion. If we average the most eroding 4% of cropland, the rates drop to 20 tons nationally, 8.7 tons in EQIP priority areas, and 6.0 tons in EQIP priority areas where erosion is a major resource concern.

If we use the national ranking system, there is small chance of significantly lowering the average erosion rate of erosion practices applied with the new enlarged EQIP program. This analysis estimates an average erosion reduction of 8.6 tons per acre per year. If you assume a remaining erosion rate after treatment of 3.1 tons (the national average), then the 3,431,131 acres treated would have to average 11.7 tons of erosion annual. That erosion reduction rate would be difficult to achieve if the expanded program funding were primarily going to the current EQIP priority areas. If spread nationally, there were 15 million acres of cultivated cropland eroding at that rate or greater in 1997. But we could not achieve that erosion reduction if the funds were limited only to the current EQIP priority areas with erosion as a major resource concern.

Table A2-1. Average sheet and rill erosion rates for the 1% & 4% of cultivated land with the highest erosion rates.

Standard errors are showed in the adjacent column.

AREA	Percent	Total Annual Erosion	Standard Error	Total Area Cropland Erosion	Standard Error	**Average Erosion Rate**	Standard Error
Units	%	Tons/yr	Tons/yr	1000 ac	1000 ac	Tons/ac/yr	Tons/ac/yr
Lower 48 states	1%	88,161	-2,420	3,263	-83.9	**27.0**	-0.3
EQIP Priority Areas	1%	55,084	-1,668	3,263	-88.4	**16.9**	-0.3
Erosion Concerns	1%	41,745	-1,298	3,263	-87.2	**12.8**	-0.2
Lower 48 states	4%	261,082	-3,783	13,054	-169.4	**20.0**	-0.1
EQIP Priority Areas	4%	113,788	-1,982.00	13,055	-192.7	**8.7**	-0.1
Erosion Concerns	4%	77,825	-1,429	13,055	-178	**6.0**	-0.1

Table A2-2. Average sheet and rill erosion rates by region for 1% of cultivated land with the highest erosion rates.

Standard errors are in parentheses.

Region	Total Annual Erosion	SE	Total Area	SE	Avg. Erosion Rate	SE
	Tons/yr	*Tons/yr*	*1000 ac*	*1000 ac*	*Tons/ac/yr*	*Tons/ac/yr*
Northeast	3,994	(509.5)	93	(11.2)	43.0	(1.5)
Midwest	46,059	(2101.3)	1,163	(48.7)	39.6	(.7)
Northern Plains	20,881	(1148.4)	1,009	(53.1)	20.7	(.3)
South Central	7,700	(609.2)	484	(37.8)	15.9	(.4)
Southeast	15,493	(1297.9)	290	(22.6)	53.4	(2.)
West*	5,434	(857.1)	221	(30.8)	24.6	(1.2)
Lower 48 States	88,161	(2420.)	3,263	(83.9)	27.0	(.3)

* Only the states that area part of the Lower 48 conterminous US are included in the Western Region summary. Alaska, Hawaii, and the Pacific Basin are a part of the NRI Western Region, but are not included in the numbers for this table.

Table A2- 3. Average sheet and rill erosion rates by region for 4% of cultivated land with the highest erosion rates.

Standard errors are in parentheses.

Region	Total Annual Erosion	SE	Total Area	SE	Average Erosion Rate	SE
	Tons/yr	*Tons/yr*	*1000 ac*	*1000 ac*	*Tons/ac/yr*	*Tons/ac/yr*
Northeast	10,021	(662.2)	373	(22.2)	26.9	(.7)
Midwest	113,117	(2645.)	4,653	(96.1)	24.3	(.3)
Northern Plains	50,033	(1468.5)	4,038	(107.7)	12.4	(.2)
South Central	21,432	(936.)	1,940	(81.6)	11.0	(.1)
Southeast	35,219	(1531.6)	1,159	(43.9)	30.4	(.7)
West*	14,577	(1148.7)	888	(64.1)	16.4	(.5)
Lower 48	261,082	(3783.4)	13,054	(169.4)	20.0	(.1)

* Only the states that area part of the Lower 48 conterminous US are included in the Western Region summary.

Table A2-4. Average sheet and rill erosion rates are given for 1% of cultivated cropland within priority areas that have the highest erosion rates.

Standard errors are in parentheses.

Region	Total Annual Erosion	SE	Total Area	SE	Average Erosion Rate	SE
	Tons/yr	Tons/yr	1000 ac	1000 ac	Tons/ac/yr	Tons/ac/yr
Northeast	2,946	(388.3)	92	(10.6)	31.9	(1.7)
Midwest	20,082	(999.6)	1,163	(49.8)	17.3	(.4)
Northern Plains	8,830	(619.7)	1,009	(67.)	8.8	(.2)
South Central	5,775	(482.9)	483	(40.)	12.0	(.2)
Southeast	9,848	(872.6)	288	(22.2)	34.2	(1.8)
West*	2,746	(356.6)	218	(26.3)	12.6	(.7)
Lower 48 States	55,084	(1,668.4)	3,263	(88.4)	16.9	(.3)
* Only the states that area part of the Lower 48 conterminous US are included in the Western Region summary.						

Table A2-5. Average sheet and rill erosion rates are given for 4% of cultivated cropland within priority areas that have the highest erosion rates.

Standard errors are in parentheses.

Region	Total Annual Erosion	SE	Total Area	SE	Average Erosion Rate	SE
	Tons/yr	Tons/yr	1000 ac	1000 ac	Tons/ac/yr	Tons/ac/yr
Northeast	6,092	(475.9)	373	(22.7)	16.3	(.7)
Midwest	38,508	(1095.9)	4,653	(98.7)	8.3	(.2)
Northern Plains	19,087	(787.8)	4,038	(146.8)	4.7	(.1)
South Central	15,057	(695.1)	1,940	(84.8)	7.8	(.1)
Southeast	20,207	(1,043.6)	1,159	(49.7)	17.4	(.6)
West*	5,020	(406.)	888	(56.8)	5.7	(.3)
Lower 48	113,788	(1,982.)	13,055	(192.7)	8.7	(.1)
* Only the states that area part of the Lower 48 conterminous US are included in the Western Region summary. Alaska, Hawaii, and the Pacific Basin are a part of the NRI Western Region, but are not included in the numbers for this table.						

Table A2-6. Average annual sheet and rill erosion rates are given for 1% and 4% most highly erosive cultivated land in the lower 48 States within priority areas having a soil erosion resource concern.

Standard errors are in parentheses.

Percent	Total Annual Erosion	SE	Total Area	SE	Average Erosion Rate	SE
	Tons/yr	Tons/yr	1000 ac	1000 ac	Tons/ac/yr	Tons/ac/yr
1%	41,745.0	(1,298.)	3,262.9	(87.2)	12.8	(.2)
4%	77,825.0	(1,429.3)	13,055.0	(178.)	6.0	(.1)

Table A2-7. National summary of priority areas by broad cover/use. Standard errors are in parentheses.

Reclass	Cultivated Cropland		Noncultivated Cropland		Pastureland	
	Thousand acres		Thousand acres		Thousand acres	
No Data	82.4	(10.1)	67.2	(14.3)	92.9	(14.5)
Soil, Other	3,924.2	(212.)	895.9	(64.4)	429.4	(34.)
Agricultural Conversion	2,433.6	(85.4)	485.4	(37.5)	867.4	(45.5)
Animal Waste	9,656.4	(145.8)	2,713.5	(84.6)	8,712.8	(152.2)
Forestry	1,024.3	(26.6)	87.9	(13.3)	243.1	(22.2)
Grazing	10,398.0	(242.5)	2,753.0	(132.2)	6,889.6	(186.)
Non-Waste Nutrient Management	5,465.5	(166.1)	2,025.9	(112.7)	2,219.2	(86.1)
Soil Erosion	22,756.0	(219.7)	2,383.3	(83.9)	6,760.6	(130.1)
Water Savings/Irrigation	6,981.4	(139.6)	621.3	(91.6)	235.2	(35.6)
Wildlife	3,222.3	(120.9)	607.9	(48.2)	1,089.9	(56.3)
Wind Erosion/Air Quality	4,130.4	(107.5)	87.3	(14.4)	48.1	(14.8)

Table A2-8. Summary of the 1997 NRI/USLE Erosion on Cultivated Cropland

Erosion Rate	Acres	Total Erosion	Points	% Acres	% Erosion
0	94,325,000	53,498,142	51621	28.86%	5.23%
1	83,746,900	121,187,619	47328	54.49%	17.08%
2	48,939,300	120,116,308	28964	69.47%	28.83%
3	29,845,500	103,143,582	17926	78.60%	38.92%
4	18,702,100	83,316,125	11381	84.32%	47.07%
5	11,834,400	64,602,092	7424	87.95%	53.38%
6	8,054,700	52,124,848	5108	90.41%	58.48%
7	5,992,500	44,788,185	3799	92.24%	62.86%
8	4,406,300	37,295,247	2851	93.59%	66.51%
9	3,561,400	33,711,977	2309	94.68%	69.81%
10	2,862,800	29,946,400	1817	95.56%	72.74%
11	2,242,800	25,761,156	1474	96.25%	75.25%
12	1,831,100	22,860,061	1217	96.81%	77.49%
13	1,355,200	18,284,819	898	97.22%	79.28%
14	1,200,400	17,370,938	801	97.59%	80.98%
15	1,030,500	15,941,041	714	97.90%	82.54%
16	883,100	14,536,480	586	98.17%	83.96%
17	674,400	11,783,769	494	98.38%	85.11%
18	552,300	10,198,643	409	98.55%	86.11%
19	518,300	10,088,081	370	98.71%	87.09%
20	434,300	8,902,367	304	98.84%	87.97%
21	405,600	8,710,740	272	98.96%	88.82%
22	360,200	8,101,387	261	99.07%	89.61%
23	263,600	6,189,757	188	99.16%	90.21%
24	244,900	6,002,595	185	99.23%	90.80%
25	223,000	5,686,238	163	99.30%	91.36%

Erosion Rate	Acres	Total Erosion	Points	% Acres	% Erosion
26	205,700	5,449,809	163	99.36%	91.89%
27	189,500	5,210,097	142	99.42%	92.40%
28	186,800	5,316,431	132	99.48%	92.92%
29	160,900	4,737,518	117	99.53%	93.38%
30	145,100	4,419,977	113	99.57%	93.82%
31	128,800	4,051,174	95	99.61%	94.21%
32	91,100	2,957,994	70	99.64%	94.50%
33	94,900	3,187,070	72	99.67%	94.81%
34	77,100	2,658,383	58	99.69%	95.07%
35	91,400	3,244,473	67	99.72%	95.39%
36	86,500	3,155,602	64	99.74%	95.70%
37	73,400	2,750,023	58	99.77%	95.97%
38	53,300	2,046,163	39	99.78%	96.17%
39	36,100	1,426,280	29	99.79%	96.31%
40	60,300	2,439,072	45	99.81%	96.55%
41	45,300	1,879,842	36	99.83%	96.73%
42	48,300	2,054,281	35	99.84%	96.93%
43	35,100	1,528,844	26	99.85%	97.08%
44	47,800	2,122,782	35	99.87%	97.29%
45	29,800	1,354,812	24	99.88%	97.42%
46	38,400	1,787,347	29	99.89%	97.60%
47	32,000	1,519,982	25	99.90%	97.74%
48	28,800	1,398,814	22	99.91%	97.88%
49	16,400	813,175	14	99.91%	97.96%
50	21,000	1,059,410	18	99.92%	98.06%
51	23,100	1,190,317	17	99.92%	98.18%
52	9,800	514,530	9	99.93%	98.23%
53	23,400	1,250,757	16	99.93%	98.35%
54	20,100	1,095,962	14	99.94%	98.46%
55	12,500	692,287	13	99.94%	98.53%
56	9,400	531,018	4	99.95%	98.58%
57	4,400	252,634	5	99.95%	98.60%
58	13,700	799,776	11	99.95%	98.68%
59	9,100	540,634	5	99.96%	98.74%
60	5,700	345,725	4	99.96%	98.77%
61	4,900	299,775	5	99.96%	98.80%
62	8,000	499,842	9	99.96%	98.85%
63	5,900	373,722	4	99.96%	98.88%
64	3,800	245,314	4	99.96%	98.91%
65	3,600	236,772	1	99.97%	98.93%
66	3,000	199,741	3	99.97%	98.95%
67	6,600	445,143	5	99.97%	98.99%
68	3,500	238,667	5	99.97%	99.02%
69	8,300	577,775	5	99.97%	99.07%
70	1,800	127,502	3	99.97%	99.09%
71	2,600	186,759	4	99.97%	99.10%
72	3,400	245,729	2	99.97%	99.13%

Erosion Rate	Acres	Total Erosion	Points	% Acres	% Erosion
73	1,900	140,097	2	99.98%	99.14%
74	1,600	118,976	1	99.98%	99.15%
75	2,300	173,834	1	99.98%	99.17%
76	2,400	183,216	2	99.98%	99.19%
77	1,300	101,257	2	99.98%	99.20%
78	4,400	345,130	3	99.98%	99.23%
79	3,700	293,977	2	99.98%	99.26%
80	4,300	345,621	6	99.98%	99.30%
81	2,300	187,972	2	99.98%	99.31%
82	2,000	165,006	3	99.98%	99.33%
83	4,700	392,608	2	99.98%	99.37%
84	2,100	177,843	3	99.98%	99.39%
85	2,800	238,364	3	99.99%	99.41%
86	700	60,683	1	99.99%	99.41%
87	2,000	174,796	2	99.99%	99.43%
88	2,400	212,472	1	99.99%	99.45%
89	500	44,705	1	99.99%	99.46%
91	1,800	164,491	2	99.99%	99.47%
92	2,000	185,180	2	99.99%	99.49%
93	1,600	149,522	2	99.99%	99.51%
94	700	66,150	1	99.99%	99.51%
95	1,300	124,676	2	99.99%	99.52%
96	1,600	153,856	1	99.99%	99.54%
98	6,400	630,220	3	99.99%	99.60%
100	1,900	190,570	1	99.99%	99.62%
101	2,000	202,860	1	99.99%	99.64%
102	3,300	338,127	2	99.99%	99.67%
103	1,200	124,610	2	99.99%	99.69%
104	1,500	157,140	1	100.00%	99.70%
105	900	94,680	1	100.00%	99.71%
111	300	33,363	1	100.00%	99.71%
116	800	92,864	1	100.00%	99.72%
122	600	73,770	1	100.00%	99.73%
126	600	75,744	1	100.00%	99.74%
130	1,500	196,155	1	100.00%	99.76%
133	500	66,605	1	100.00%	99.76%
135	700	94,878	1	100.00%	99.77%
144	600	86,940	1	100.00%	99.78%
173	2,500	433,975	1	100.00%	99.82%
177	2,500	443,900	1	100.00%	99.87%
180	1,200	216,984	1	100.00%	99.89%
206	600	123,660	1	100.00%	99.90%
355	1,300	461,877	1	100.00%	99.94%
405	1,400	568,344	3	100.00%	100.00%
Totals	326,783,700	1,022,516,031		190,614	

Appendix 3. Historical Funding

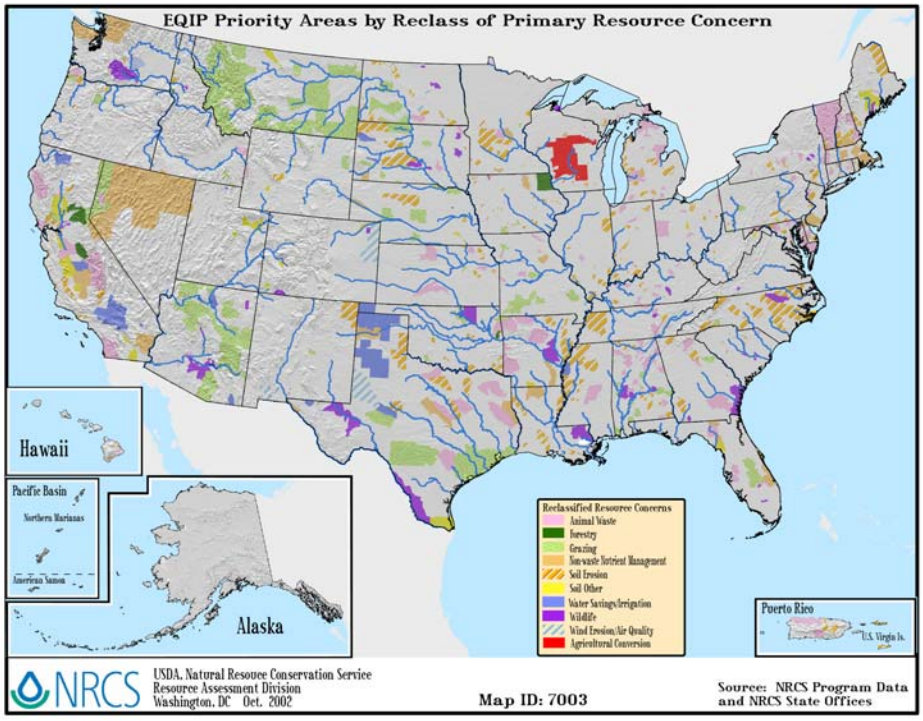
Table A3-1 Historical Funding Allocation Table

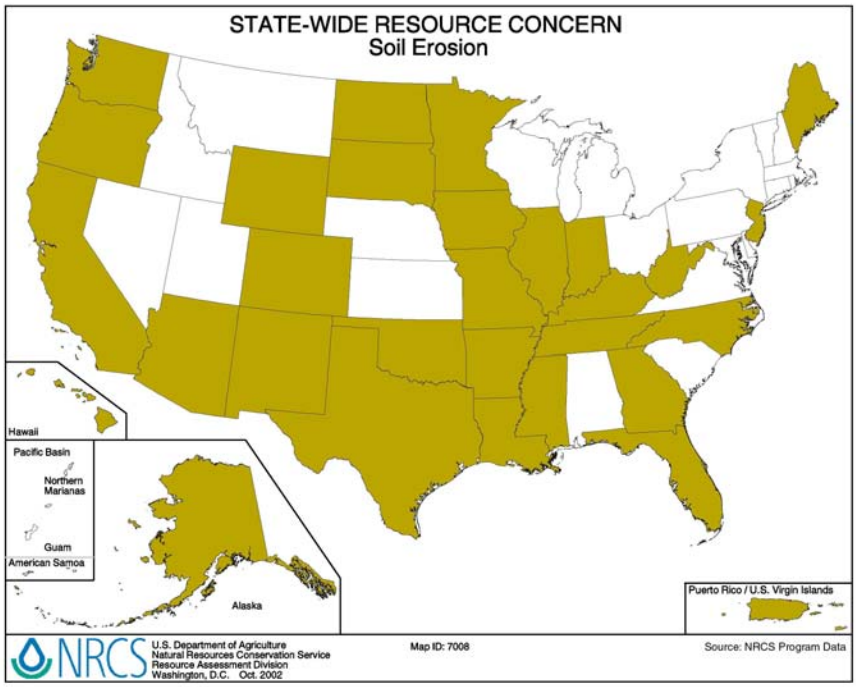
State Name	FY1997 FA/EA	FY1998 FA/EA	FY1999 FA/EA	FY2000 FA/EA	FY2001 FA/EA
Alabama	$3,888,000	$2,558,362	$2,592,000	$2,597,650	$2,977,407
Alaska	$187,635	$348,974	$341,000	$338,759	$373,945
Arizona	$2,068,942	$4,007,941	$5,571,000	$5,299,933	$5,746,769
Arkansas	$5,332,765	$5,322,539	$2,973,000	$2,964,871	$3,684,769
California	$5,211,000	$6,093,721	$6,533,000	$6,483,715	$7,426,094
Colorado	$5,940,052	$5,106,207	$5,977,000	$5,431,193	$5,741,968
Connecticut	$532,706	$490,622	$554,000	$553,250	$639,015
Delaware	$678,588	$889,546	$688,000	$684,217	$779,868
Florida	$3,422,729	$3,817,795	$3,788,000	$3,816,171	$4,387,880
Georgia	$4,274,942	$3,419,513	$2,918,000	$2,904,126	$3,320,970
Hawaii	$516,384	$814,909	$464,000	$461,684	$522,479
Idaho	$3,056,042	$3,342,894	$2,270,000	$2,323,432	$3,360,671
Illinois	$5,059,130	$3,392,080	$2,486,000	$2,469,657	$2,229,720
Indiana	$2,685,480	$2,601,221	$2,004,000	$1,980,689	$5,689,441
Iowa	$5,081,705	$4,355,834	$3,300,000	$3,285,151	$2,713,994
Kansas	$6,579,878	$4,092,604	$3,469,000	$3,547,613	$4,054,750
Kentucky	$3,275,622	$2,403,785	$2,198,000	$2,181,861	$2,515,793
Louisiana	$4,975,168	$4,552,448	$2,545,000	$2,526,585	$3,191,810
Maine	$2,834,120	$1,884,943	$1,511,000	$1,433,659	$754,883
Maryland	$1,443,006	$1,798,724	$1,506,000	$1,495,195	$1,671,831
Massachusetts	$495,000	$645,663	$621,000	$618,700	$1,602,591
Michigan	$4,581,562	$3,388,049	$3,125,000	$3,191,793	$3,504,678
Minnesota	$6,066,764	$4,583,863	$4,118,000	$4,129,263	$4,680,181
Mississippi	$4,461,596	$4,544,757	$3,512,000	$3,453,280	$4,077,228
Missouri	$5,311,851	$3,973,544	$3,525,000	$3,516,169	$4,219,923
Montana	$6,635,000	$5,064,352	$4,614,000	$4,630,930	$5,225,886
Nebraska	$5,578,966	$4,088,258	$3,402,000	$3,684,489	$497,193
Nevada	$958,725	$1,203,058	$1,017,000	$1,008,378	$3,697,037
New Hampshire	$565,000	$302,862	$431,000	$442,377	$780,354
New Jersey	$655,000	$854,537	$684,000	$680,158	$4,679,467
New Mexico	$2,829,218	$3,093,048	$4,145,000	$4,254,648	$3,107,456
New York	$3,646,845	$3,693,819	$2,696,000	$2,737,609	$3,447,188
North Carolina	$4,099,000	$4,544,884	$3,537,000	$3,245,790	$3,885,430
North Dakota	$4,365,581	$3,551,416	$3,000,000	$3,075,588	$1,156,421
Ohio	$3,188,146	$3,445,064	$2,328,000	$2,308,695	$2,628,589
Oklahoma	$4,523,238	$4,392,203	$3,702,000	$3,598,106	$4,058,146
Oregon	$3,610,138	$3,375,279	$3,192,000	$3,163,714	$3,546,663
Pennsylvania	$3,577,507	$3,418,467	$2,417,000	$2,405,980	$2,720,362
Rhode Island	$270,863	$196,411	$300,000	$298,452	$338,388
South Carolina	$2,649,022	$1,671,152	$1,616,000	$1,608,614	$1,844,920
South Dakota	$4,307,999	$3,457,090	$3,401,000	$3,412,729	$3,796,249
Tennessee	$2,905,893	$2,447,248	$2,159,000	$2,159,059	$2,518,300
Texas	$14,326,531	$13,168,047	$10,772,000	$10,787,863	$12,279,955
Utah	$3,325,047	$3,059,727	$2,534,000	$3,286,172	$3,768,390
Vermont	$1,348,000	$1,008,376	$948,000	$946,019	$2,565,197

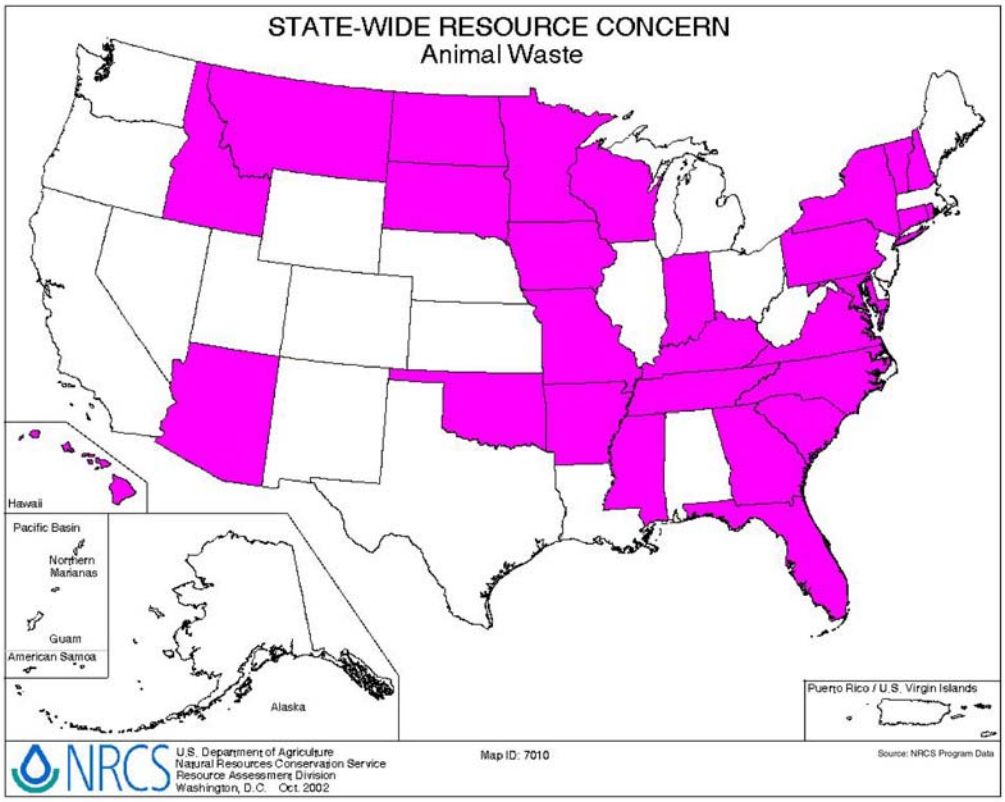
Virginia	$3,154,146	$2,182,231	$2,260,000	$2,276,641	$1,036,429
Washington	$3,671,583	$3,947,562	$2,995,000	$3,020,743	$3,391,154
West Virginia	$1,800,208	$1,488,535	$1,280,000	$1,275,429	$3,688,062
Wisconsin	$4,508,131	$3,474,582	$3,215,000	$3,233,234	$1,461,414
Wyoming	$2,882,502	$3,086,801	$2,798,000	$2,638,301	$2,950,394
Pacific Basic	$238,938	$412,535	$225,000	$391,995	$280,009
Caribbean Area	$418,104	$941,921	$683,000	$679,670	$730,707
NHQ Cont. Mod. Res.	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,005,253
TOTALS	**$180,000,000**	**$162,000,000**	**$140,940,000**	**$140,940,000**	**$161,953,668**

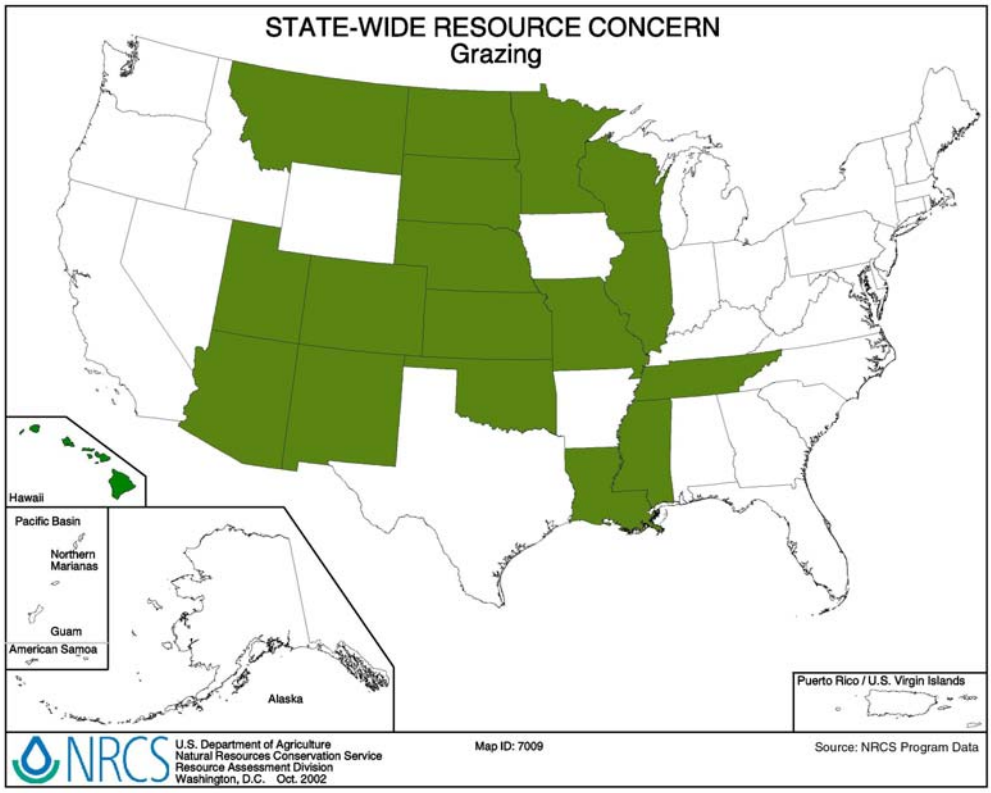
Appendix 4. Maps of Geographic Priority Area and Statewide Resource Concerns

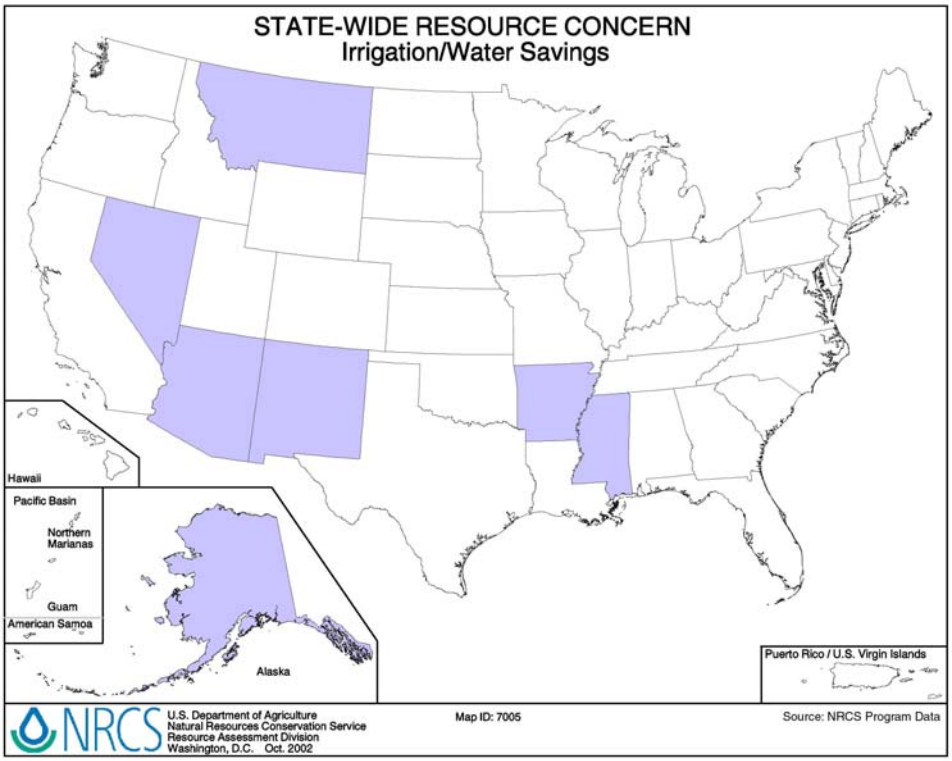
Reclassified by Quantified Resource Concerns

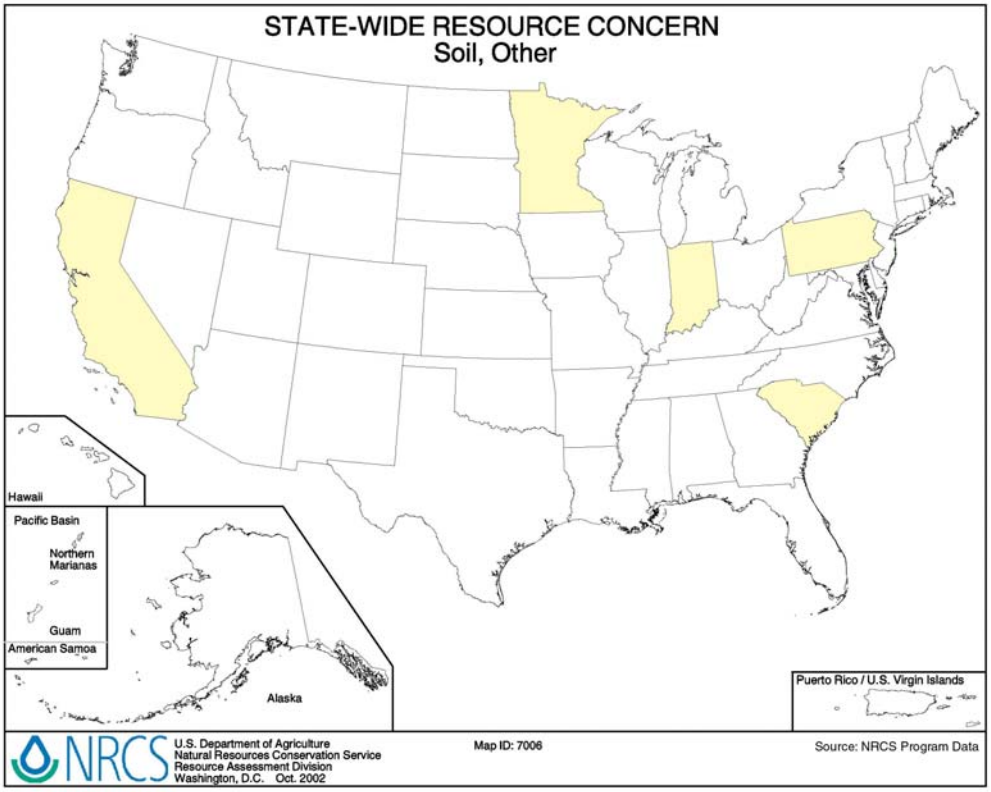


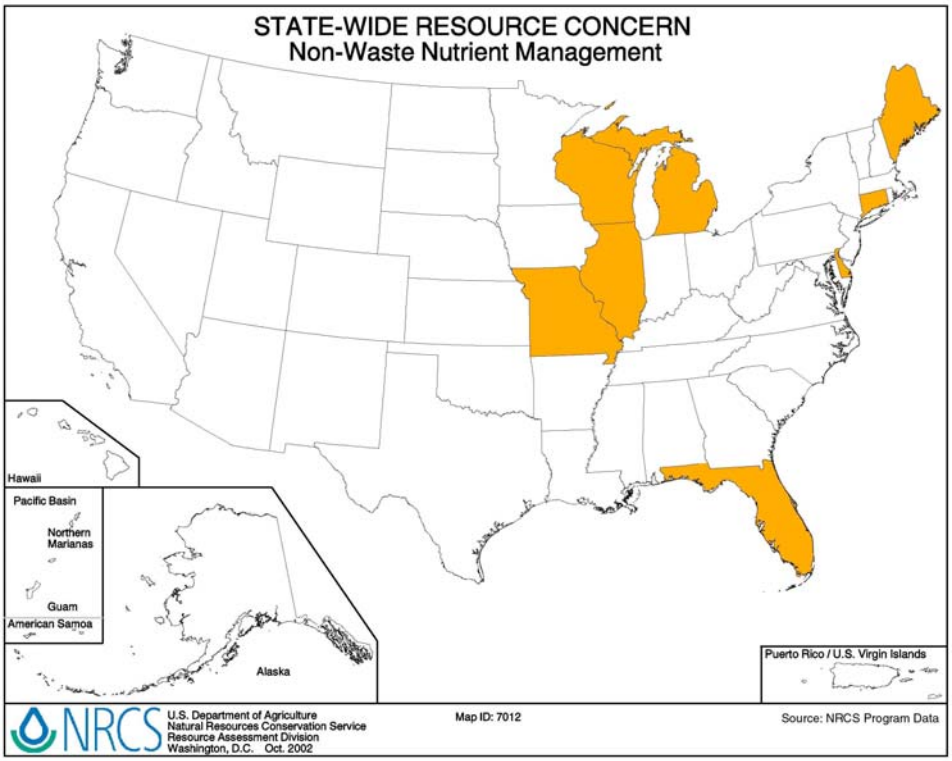


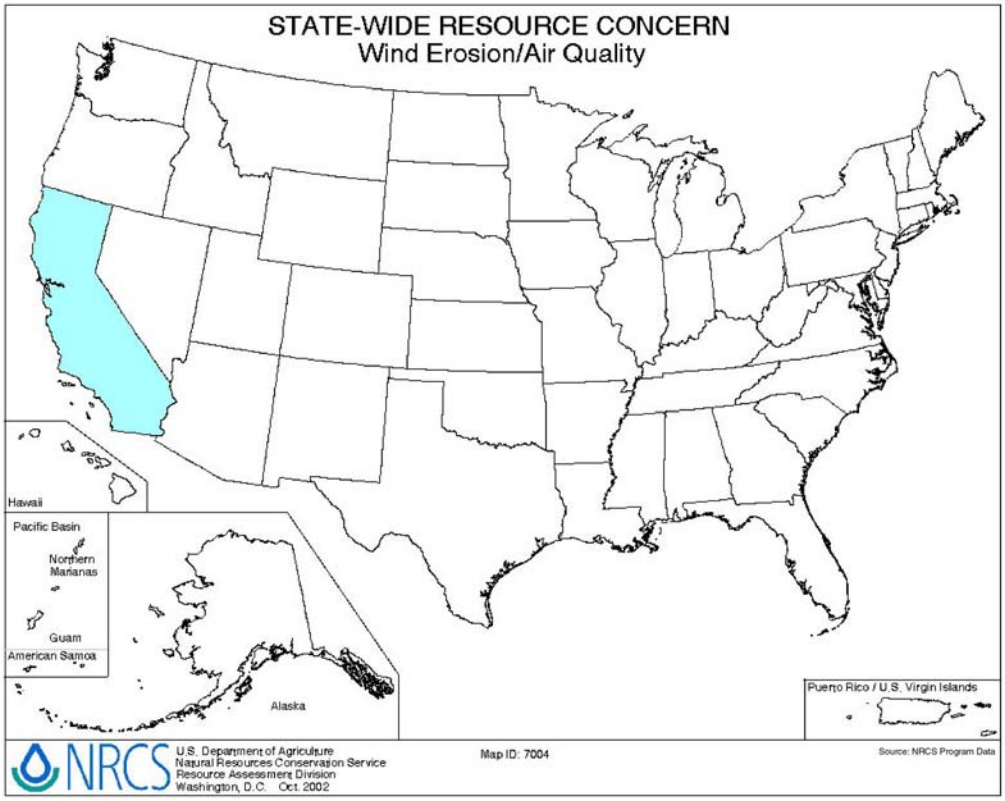

STATE-WIDE RESOURCE CONCERN
Animal Waste
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7010
Source: NRCS Program Data

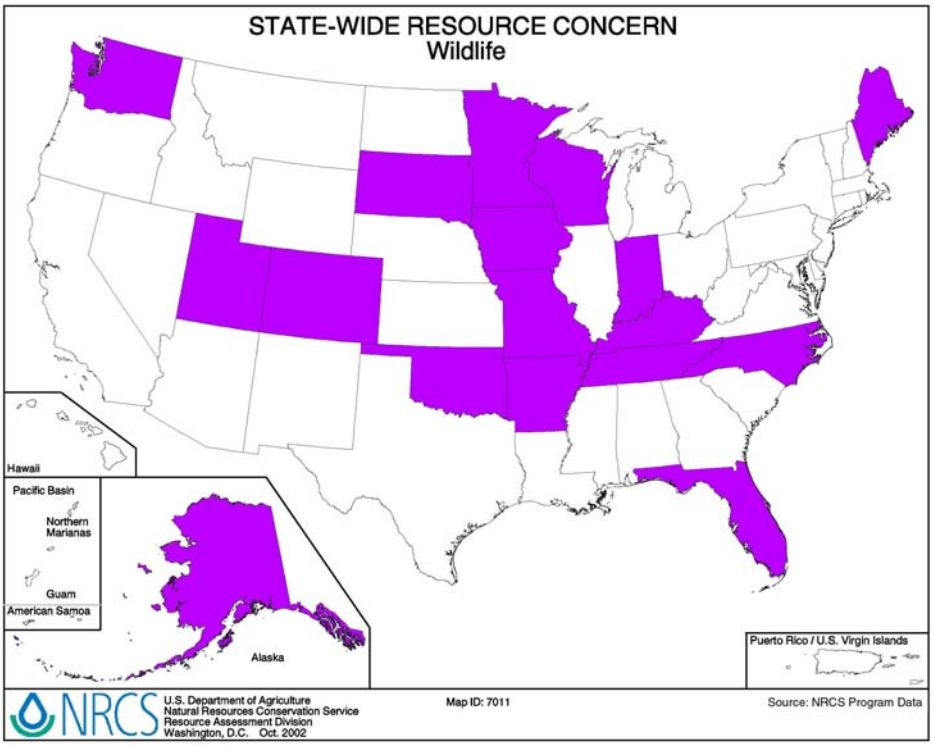

STATE-WIDE RESOURCE CONCERN
Grazing
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7009
Source: NRCS Program Data

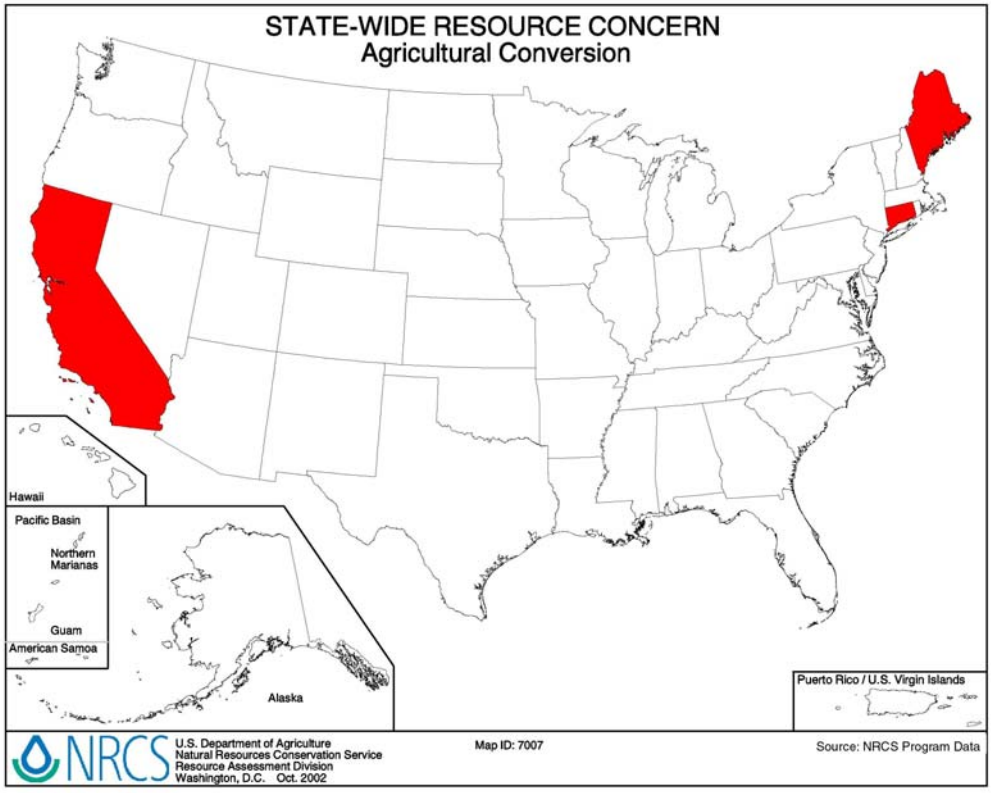

STATE-WIDE RESOURCE CONCERN
Irrigation/Water Savings
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7005
Source: NRCS Program Data


STATE-WIDE RESOURCE CONCERN
Soil, Other
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7006
Source: NRCS Program Data


STATE-WIDE RESOURCE CONCERN
Non-Waste Nutrient Management
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7012
Source: NRCS Program Data


STATE-WIDE RESOURCE CONCERN
Wind Erosion/Air Quality
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7004
Source: NRCS Program Data


STATE-WIDE RESOURCE CONCERN
Wildlife
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7011
Source: NRCS Program Data


STATE-WIDE RESOURCE CONCERN
Agricultural Conversion
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. Oct. 2002
Map ID: 7007
Source: NRCS Program Data